UNCLE SAM'S MODERN MIRACLES

WILLIAM ATHERTON DU PUY

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UNCLE SAM'S MODERN MIRACLES

THE WELDING OF A SEVERED MOUNTAIN CHAIN

UNCLE SAM'S MODERN MIRACLES

HIS GIGANTIC TASKS THAT BENEFIT HUMANITY

BY

WILLIAM ATHERTON DU PUY

WITH FIFTEEN ILLUSTRATIONS FROM PHOTOGRAPHS

NEW YORK
FREDERICK A. STOKES COMPANY
PUBLISHERS

JK424
.D8

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September, 1914

SEP 22 1914

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TO

THE PATRIOT OF VISION

WHO HAS EYES TO SEE THE VAST

HUMANITARIAN IDEA

THAT LIES BENEATH THE OUTWARD MANIFESTATIONS

OF THE GOVERNMENT'S GREAT WORKS

THIS BOOK IS DEDICATED

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INTRODUCTION

The present is the age of huge accomplishments. Man individually and man in all sorts of groups is doing bigger things than ever before since Adam. The development of knowledge, of organization, of machinery, is making this possible. Actual accomplishments of to-day outrival the most fantastic imaginings of a generation ago.

Men the world around are taking part in the performance of these modern miracles, are showing themselves in tune with the spirit of the times. Even the European or the Oriental is ready, however, to acknowledge that the American embodies that spirit more ideally than does the representative of any other nation. Young, virile, unbound by any precedent, he strikes out, undismayed, into the field of the hitherto unaccomplished.

A nation but foreshadows the nature of the individuals that go to make it up. So it comes to pass that the United States is the land of them all in this age of stupendous accomplishment that should be expected to undertake such tasks as would stagger any other agency of the present or the past. Were the United States a small nation made up of the same original and aggressive individuals that compose its citizenship, the possibility of vast national

undertakings would be lessened. But instead of this it stands forth as the towering young giant among the countries of the world—vast in territory, strong in numbers, incomparable in wealth.

Could a fitter agency for the performance of such tasks as would astound the Gods be selected?

And the United States is rising to the occasion. Since time began there have been great works that have cried aloud to be done but which have been so large as to discourage any existing organization. Individuals and corporations have bound the oceans together with steel rails, have disemboweled the earth for its buried treasure, have built dizzying skyscrapers, have harnessed the tumbling waterfall. But none were great enough to cut two continents apart at Panama.

The digging of the canal is a thing so definite and tangible that its magnificent proportions may be seen at a glance. The average man views it as the overtopping accomplishment of the age that stands superbly alone. Yet during the decade of its building the federal government has had under way a score of tasks as important and many of which may demand of the historian of the future as thoughtful attention.

For the young Hercules among nations has gone forth and grappled successfully with the dragons of disease that have stalked devouringly about the world for ten thousand years. He has stretched forth his hand and lifted the pall of tyranny and

ignorance and disease and isolation from eight million people in the Orient. He has issued his commands to the titanic floods of the Mississippi and they have obeyed him. He has sought to better the condition of his most valuable asset, the mother on the farm, and much has been accomplished. He has reclaimed deserts, conserved forests, blanketed the world with wireless.

Back of most of these tasks there has stood one great principle—the well-being of humanity. Uncle Sam has labored that men and women might live better, cleaner, happier lives. Sometimes these people have been of his own family, sometimes yellow men of the Far East, sometimes unappreciative Latins of the Caribbean. The effort has been as earnest and unselfish in the one case as in the other.

The average American is a busy individual occupied with attaining success. The hustle of his calling, and the compromises he makes with himself in its outward manifestations, may not be good to look upon. But most men have their own secret charities and each is at heart a philanthropist.

So does the federal government in the bickerings and the compromise of surface politics appear in its worst light, and come into disrepute with the casual observer. But that government is actually a great, onrushing stream that spreads itself out upon the desert lives of all its people and brings to them the flower of productivity and the possibility of a harvest

of happiness. Its gigantic undertakings are manifestations of its innermost soul where it stands forth and reveals the granite of its real character.

To him who has lost faith in his fellows, in society, in government, I would extend an invitation to come with me for an inspection of the really worth while undertakings to which the old man with the whiskers and the boots has set his hand. To him who is merely indifferent the same invitation is issued with a guarantee that he will know the joy of enthusiasm. For the government of the United States is to-day the greatest human force in existence, is accomplishing the most stupendous, the most unselfish, the most epoch-making tasks performed since man began to take thought that he and his fellow might live better lives. The individual whose citizenship gives him a claim to a part in those modern miracles and who still misses the thrill of a just patriotic pride is robbing himself of a rare boon.

UNCLE SAM'S MODERN MIRACLES

UNCLE SAM'S MODERN MIRACLES

CHAPTER I

CONQUERING CONTAGION

IF plague breaks out to-day in Calcutta, or Amoy, or St. Petersburg, or at Punta Arenas on the Strait of Magellan, or at Basra on the Persian Gulf, or at Topeka, Kansas, or at any place else in the whole wide world, certain governmental authorities at Washington will know of it to-morrow and the organization of defense against it will be put in operation. If the contagion is beyond our own borders a barrier is immediately thrown up which makes it next to impossible for the disease to enter at any of the 17,000 miles of American coastline. If it is within and a serious menace, a cordon of health police is thrown around it and science is set to work on its extermination. If it is some strange malady outside the realm of established knowledge, the spotlight of science is flashed upon it and all that man knows is brought to the solution of its riddle.

The federal agency having in hand the gigantic undertaking of battling the disease of the world is the national Public Health Service. With the idea that health is a national asset this government bureau has been placed under the Treasury Department. The backbone of the service is its staff of about 140 surgeons who bear commissions, thus comprising a military organization which wears a uniform. Supplementing these is a staff of some 250 acting assistant surgeons, various internes, pharmacists and hospital attendants which brings the direct employes of the bureau up to 1,500.

This is the nucleus for Uncle Sam's fight against disease that might otherwise more seriously affect the well-being of his hundred million citizens. But this organization fits into a general scheme of things that brings to its aid the health authorities of all the states and of all the cities under the flag, which makes co-workers of the consuls of the nations scattered throughout the world which labors hand in hand with other far-seeing countries which know the necessity of a constantly improving condition of world health.

From the world standpoint there are strategic points in the fight against disease. From the Far East there is always the danger of inroads of deadly bubonic plague or equally deadly cholera. Yokohama, Hong Kong, Amoy, Shanghai, and Calcutta are points where these diseases may originate and from which they may be spread because the ships

of the world call there. Naples is a lookout point for the Mediterranean. Libau, the Port of St. Petersburg, is the gateway for many emigrants; Guayaquil is a pest hole of South America; Havana is the watch tower of the Caribbean; Rio Janeiro the strategic point of the east coast of South America.

At all these points and at twenty others the Public Health Service of the United States has highly trained health scouts regularly stationed. The duty of these commissioned surgeons is to watch with unceasing vigilance for contagion and keep the home office posted. Likewise are they ever ready to strike when occasion arises. So vigilant are they that they know immediately when there is a dangerous outbreak of disease in their part of the world.

Supplementary to these scouts of the Public Health Service are the United States consuls. Disease spreads through trade and a consul is stationed in every trade center of importance from pole to pole. In all there are 500 cities in the world in which are stationed representatives of the consular service and these are the 500 most important commercial centers.

Every consular officer is a health scout. While he may not be a medical officer as is the special representative of the Public Health Service it is none the less his duty to maintain an eternal vigilance for contagion than to watch trade conditions. Every week every one of these consular officers

makes a written report to the Public Health Service. Every mail brings a stream of these reports to headquarters at Washington. Wherever there may be an outbreak of any sort of disease that may be regarded as serious, the consul uses the cable and Washington knows immediately.

Through state and municipal health agencies and from its own representatives the Public Health Service gets similar reports from every corner of the United States and its possessions. This completes the survey of the world. From each week's accumulation of health reports is compiled a sanitary chart of the world. This chart shows at a glance just what there is abroad in the way of disease the world around and just where it is. The chart is distributed to all the health and consular representatives that have contributed to its making that they, in return, may be kept thoroughly posted as to the general health condition and aware of what may be expected. Any man in all this great plan can tell you at a glance the exact health condition of all the world. If a ship comes to his port from any other port he looks at the chart and knows what disease he should look for on that ship.

Consul Norton at Bombay, India, might discover the existence of plague at that port. He would immediately cable the health office at Washington. Washington would cable the Health Service representative in Calcutta, the surgeon nearest Bombay, and that official would immediately take charge of

the situation with relation to the departure of ships that were to make American ports. Washington would at the same time cable Manila to guard against plague on all ships arriving from Bombay. The word would be passed throughout the archipelago, to Samoa, Honolulu, Guam. The Mediterranean outposts would become watchful of ships from the East. San Francisco would take precautions, New Orleans and New York would become watchful. Other progressive nations would pass the word and become equally vigilant. The one flash from Bombay would have tightened the health net of the world.

Plague is borne by fleas that are borne by rats. The flea bites the plague victim, then bites the rat, which gets the plague. All the other fleas that bite the rat get the plague and give it to other rats and take it from them to human beings. The problem in keeping plague from spreading is to keep the rats from traveling.

There being plague in Bombay the consular and health officers of the nations see to it that no vessel ties up to a wharf in such a way that a rat may get aboard. These officers allow no freight to go aboard that might carry rats unless it is known to have come direct from a non-infected district. The same regulation is applied to passengers and crew. The ship's papers, officially signed, state the facts with relation to all these things. The health authorities want to make commerce possible despite the exist-

ence of contagious disease. So do they prove themselves directly a boon to business.

The vessel in the above case departs for the Philippines. From headquarters is issued a proclamation that all vessels from Bombay must report at Manila. If this vessel arrives at any other port it is not allowed to land but must go to Manila for rigid inspection. It is there given a most thorough overhauling. No lines are put out over which a rat might get to shore. A busy little tug may go alongside and its funnel gases may be caught with a hood and run into the hold of the ship and all life there exterminated, or the ship may be otherwise fumigated.

For cholera there would be a different sort of vigilance necessary. This is a water-borne disease like typhoid. It develops in five days or not at all. When there is cholera in a port, passengers and crew of any ship leaving it are under observation for five days prior to its departure. If a given ship is under suspicion those desiring to land at a given port are detained five days. Smallpox is handled similarly. A suspicion of each form of contagion requires a different sort of vigilance but the authorities at every port know what to suspect on every ship that lands and all illnesses at port are looked upon with suspicion, for the results may be stupendously disastrous.

Maintaining this quarantine is mighty strenuous work. Whenever any ship comes to an American

port anywhere she must be rigidly inspected by a federal health officer. Always there are many people anxious to get ashore. Often every hour of delay will mean hundreds of dollars of loss to a large ship. The health authorities want to cause the least possible inconvenience. So the Public Health boat tries to meet all ships in all weathers on all seas with the least possible delay. The young surgeon aboard his launch trying to catch the ladder of a great steamer, with the waves running house-top high, has no easy task. But they do it day after day at a hundred ports.

But despite these precautions contagious diseases sometimes get in. Smallpox occasionally gets across the Mexican line. Yellow fever crowds up from Latin America. Plague has given the authorities a tussle at San Francisco and in Porto Rico within the last few years. Trachoma is present among the American Indians. Typhoid may be abroad over a great area. These give opportunity for many a merry struggle between the health officers and the monster of death.

The authorities of every town and city and state report the presence of disease that may be of more than local interest. So is the national Public Health Service advised when an outbreak may affect interstate health. So, also, may the federal authorities be called in when the state needs aid in handling some particularly difficult situation.

Trachoma, against which there is such vigilance at

the ports where immigrants are admitted, is running riot among the mountaineers of Kentucky. Those men of the hills whom the outside world has known chiefly through their feuds, are going blind because of the immigrant disease that has got into their eyes. There are six counties with 100,000 people among whom one in five has trachoma. Blindness is bearing in upon these pure-blood Americans lost in an eddy of the nation's stream of progress.

The State of Kentucky became aware of this condition. It felt unequal to so great a task as its eradication and called upon the nation for help. Men of the Public Health Service have gone into the mountains and have established four hospitals. Throughout the mountains they have sent their representatives and the blind are being gathered together and those on the way toward blindness are being cured. The disease is being steadily crowded out and many men of to-morrow who might have been blind will see.

The recent outbreak of bubonic plague in Porto Rico was a good example of the effective work that may be done in stamping out a disease that might mean the death of a nation. There were thirty cases of it in Porto Rico when the Public Health Service took hold of the situation. This meant that the worst of plagues was well established.

The Service always has available a flying squad of surgeons that it may fling against any point of disease attack. Five of these young health cru-

saders were hurried to San Juan. No sooner had they landed than the attack was begun. The first move was the organization of squads for the trapping of rats. Great numbers of the vermin were caught in all parts of the city. The point of capture of each rat was carefully recorded. Each was examined for plague-infection. If this was found the disease was known to exist in the part of the city from which it came. So was the extent of the disease soon established.

Then was the battle begun to narrow that area. Squads of men would then begin a cleaning up that was so effectual that no rat could find a hiding-place within it. Basements were cemented and rat-proofed and fumigated. All rubbish was removed, every burrow destroyed. Block by block was the area of plague-free territory increased. The affected section grew steadily smaller. Rats were constantly caught throughout the city as proof of its healthy condition. Such a cleaning up was administered to San Juan as has seldom been visited on any city except Havana and San Francisco and Manila and some others upon which Uncle Sam has visited especial attention. It could have been accomplished only through that efficiency and thoroughness that modern men of action and science are bringing to bear on such problems. The result was not merely the eradication of the disease but the creation of a Spotless Town in Porto Rico.

Typhoid fever, which is transmitted through water or milk, often grows prevalent in a given city or a given watershed. In some cases it is a great piece of detective work to determine the source of this fever. Often it is beyond the local authorities and the federal Health Service is called in. A careful study is made of all past cases. Particularly is inquiry made into the source of the milk and the water that has been used by those who have been sick. If they are mostly children suspicion is thrown on the milk, for children are the milk drinkers. If there are a majority of grown-ups the water is under suspicion. If the milk drunk by a large percentage of the children affected is from a certain dairy, that institution is placed under suspicion and investigated. If the water drunk by the grown-ups affected is from a certain well or stream, that supply is given an overhauling. Eventually these men of science trace the dread germ to its source and the cause of the epidemic is removed.

The young Davids of the Public Health Service are constantly going forth to battle with new and unknown Goliaths. Almost every year some of them give up their lives in this dangerous work, the chronicles of which read like fiction.

The scientific world, for instance, is just now coming to understand typhus fever. This is the ancient disease which caused many plagues in Biblical times. It has been known as jail fever and camp fever during many a war. Until recently it

was not believed to exist in the United States. Some years ago, however, it broke out in the city of Mexico. Three expeditions went there to study it. One was from the University of Chicago, one from the University of Ohio, and one from the Hygienic Laboratory of the Public Health Service. There were two men in each expedition. In each expedition one man came down with the fever. Of the Chicago party Dr. Rickets died. Of the University of Ohio expedition, Dr. Coneff died. Of the Hygienic Laboratory expedition, Dr. Joseph Goldberger came down with the disease but eventually recovered. This case may be cited as typical of the dangers attached to this sort of work. Dr. Goldberger has contracted in the line of his work, besides typhus, yellow fever, dengue, and typhoid, the dangers of death from each of which is greater than from a bullet through the chest.

About the time that Dr. Goldberger returned from Mexico, Dr. Brill, of New York, issued a treatise on a fever which has since come to be known as Brill's disease. The government surgeons studied this report and noted striking resemblances between Brill's disease and the typhus they had been studying. They had proved that a monkey infected with typhus fever but which had recovered from it could not be again infected. They infected certain monkeys with Brill's disease. These monkeys, after recovering, were taken to Mexico and exposed to the typhus fever. They did not become infected.

Other monkeys that had not been infected with Brill's disease readily took typhus. So was it established that Brill's disease and typhus fever were the same thing. Incidentally the fact was established that both were transmitted in the same way by insects, and that both were present in most American cities.

This is typical of the original work of the Public Health Service. The Hygienic Laboratory is the highly skilled institution that carries on such work.

To the Laboratory were brought a large collection of ticks from Bitter Root Valley, Montana. These ticks were well loaded with spotted fever, a complaint peculiar to the Rocky Mountains. Spotted fever is plentiful among the ground squirrels of the Rockies. Ticks bite the ground squirrels and incidentally one occasionally bites a man. The man in nine cases of ten dies. Past Assistant Surgeon Thomas B. McClintic went to Montana to study spotted fever. He wanted to find a method of eradicating it. In the course of his work Dr. McClintic was bitten by one of these ticks, came down with the disease, and died en route to Washington.

In the meantime, however, he had acquired a great deal of material from which to study the disease and a nucleus of it had been planted to grow at the Laboratory. The disease was transmitted to guinea-pigs that it might be watched in running

its course in these small animals. Eventually the secrets of the disease were found out, and thereby the lives of a dozen sturdy citizens of Bitter Root Valley each year will be spared.

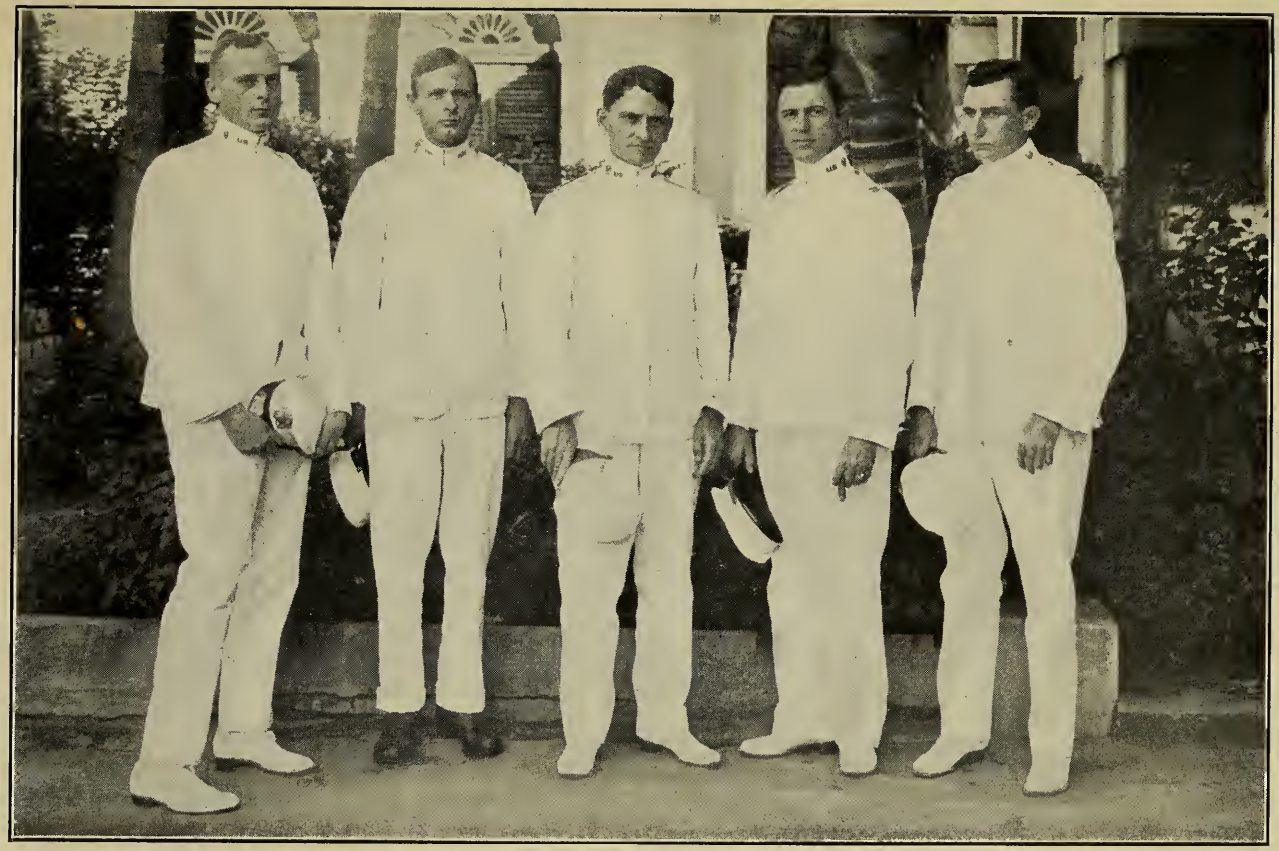
Ground squirrels have plague in California, and a long fight has been waged for the extermination of those affected. An example of the risks run by these battlers with disease is shown by these ground squirrel exterminators. After killing the squirrels from a given burrow, these men want to know if plague is harbored there. To determine this, fleas from the burrow must be captured. A member of the health squad thrusts his arm into the hole where the suspected squirrels have lived. The hungry fleas pounce upon it and are captured. The owner of the arm runs the chance of getting plague.

Altogether this health fight is a very large task and one that is being creditably performed. So signally has Uncle Sam succeeded in Havana and Panama and Manila that he is being called upon to assist in driving disease from many foreign cities. There is, for instance, the case of Iquitos, Peru, the rubber camp far up the Amazon. Iquitos borrowed a surgeon from the United States who freed it of yellow fever in six months, a condition previously unknown.

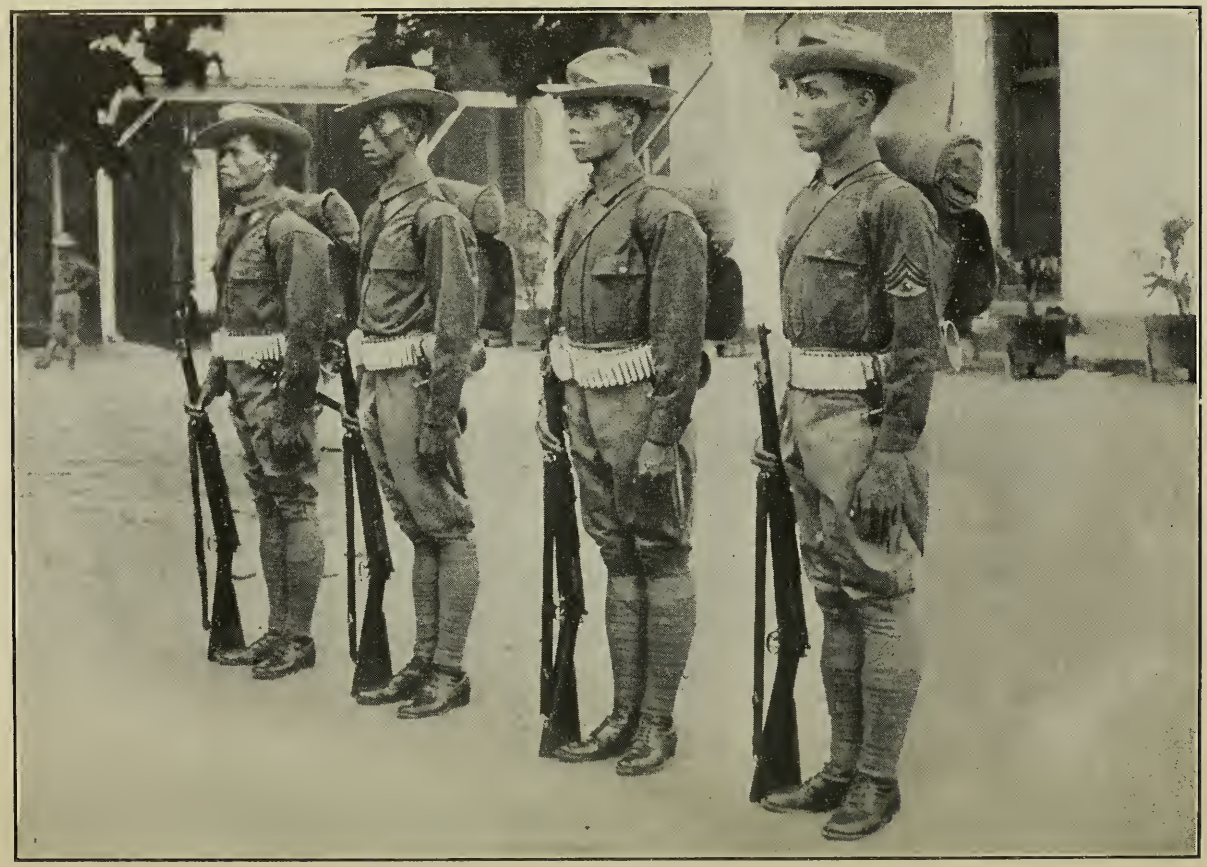
The risk of death encountered by these soldiers in the war against disease is always willingly assumed. The crusader feels that his risk may result, in the

cycle of a century, in the saving of a million lives and that such a privilege rarely comes to a man. Such a discovery as the transmission of yellow fever by the mosquito is surely of this importance.

Uncle Sam's Public Health Service is establishing health standards for the world. The disease and suffering and death that it is preventing is beyond estimate. Assuredly it contributes materially to the happiness of the world, and gives the American additional cause for pride in his citizenship.



THE SQUAD THAT FOUGHT THE PLAGUE IN PORTO RICO



PROUD MEMBERS OF THE PHILIPINO CONSTABULARY

CHAPTER II

AWAKENING THE FILIPINO

UNCLE Sam in the Philippines is performing one of the very biggest tasks in the world to-day, and one large with world influences. Upon those 2,000 islands of the South Seas is being planted and nurtured the governmental ideas of the brand-new West. Eight million Malays, members of a race whose civilization was old before the Anglo-Saxon came into existence, are being hustled into becoming self-governing republicans, a thing never dreamed of on their side of the world until this task was begun. In the virgin field here offered are being planted elements of government so recently demonstrated that they have not yet been established in the States. If this governmental experiment proves a success its influence may easily make over the map of the Far East.

Into this eddy of the world where matters have changed but little while the West has raced through centuries of headlong development, 8,000,000 yellow people are being trained to speak and read and write English, the language of steamships, electricity, and the aeroplane. Eight millions of these people are being given the tools of the modern and the training

that makes for efficient use of these tools. The markets of the world are being opened to them, the lore of the world, the field of world opportunity. They are being awakened and brought into a realization of their heirship to all the ages. They of all their kind are the first to try out the civilization of their fellows on the other side of the world.

But if these men become 8,000,000 demonstrations of orientals made potent by the touch of the West, may not the whole East become awakened?

Uncle Sam is governing these people of the Philippines as no conquered people has ever been governed before since the world began. He has, in his administration of their affairs, one central idea—the improvement of the condition of the native. All other nations in all times have exploited conquered peoples for the profit of the conquerors. The conquerors have planned to keep their subjects well under control, to keep them poor, weak, ignorant, that this might be the easier. The United States has sought to develop its subject race into strength, wisdom, prosperity, that it might ultimately be given independence. Thus are the Philippines being made an object lesson in colonial government to all the nations of the world. Thus is the United States demonstrating the great, humanitarian sentiment that underlies its government and which constantly lifts it above mere commercialism.

It has been half a generation since the United States came into possession of these far eastern

islands. Their area is about that of the six New England states plus New York and New Jersey. It is 2,400 miles from their northernmost point to the southernmost and they reach almost to the equator. There are as many people living in them as there are in New York and Chicago and Washington and San Francisco combined. In the Rocky Mountain states and the Pacific Coast states taken together there are fewer people than in the Philippines. So may it be seen that it was no small guardianship that was placed on this nation.

In these islands there were some sixty different tribes speaking different dialects. They were all nominally under the rule of Spain and had been since days before the United States came into being. Yet they were barely touched by the Spanish influence and but a handful of them spoke the language. The lack of a common language made commerce difficult between the tribes and usually there was war. The population huddled together in villages that were without sanitation, and disease stalked abroad in the land. Pestilence, plague, consumption, ran riot and received no treatment. Communication between the islands was most difficult. The rule of the Spaniard had been high-handed and cruel. The people were without spirit and without hope.

In place of these conditions there is to-day, a system of schools on the American plan that has already carried the rudiments of an education to

2,000,000 young Filipinos. There is peace throughout the entire region, with ample provision for its maintenance. There is communication by regularly scheduled boats with all the important islands. Sanitary science has found its way throughout the islands, railroads are pushing out in half a dozen directions, industries are developing, the native is learning how to work and is finding that by his labor he can provide himself with a competence.

One of the first big ideas that Americans in the Philippines began to work out was that of the public school. Education was the surest road to advancement. They saw that the islands could not be developed into a homogeneous nation unless the people were given a common language which would make intercourse and therefore commerce possible between them. They consequently inaugurated the system of schools under which they had grown up and, wherever they could induce a dozen children of the wild to come together, there was set up a classroom with a teacher in charge to point the way to reading and writing and a smattering of figures.

So there have come to be 4,000 public schools in the islands. These are attended by 600,000 pupils who receive instruction from 700 American teachers and 8,000 Filipino teachers, these latter being placed in charge of schools as fast as they prove their efficiency. Since the American schools were opened in the islands, 2,000,000 different

youngsters have been enrolled and all of these have gained a considerable understanding of English and American living. At this rate it is estimated that the common language scheme will be an actual accomplishment in a few decades.

By the time the basis of a school system had been laid down in the Philippines, the Americans had come to an appreciation of the fact that the education of these people should be toward manual productiveness. The schools should teach them to work. The idea of the industrial school was just coming into popularity in the States but was being introduced slowly there because they had an established organization to displace.

In the Philippines there was nothing to displace. The industrial school was the first school. There is no other community in the world to-day where the industrial idea is so generally predominant in the schools as in those of the Philippines. Ninety-five per cent. of the pupils are in industrial courses. Every city and town school has its manual training department. The remotest mountain district has its school garden. These wild boys of the hills are competing in corn clubs as are the youths of Iowa. Special attention is paid to training in the native industries, such as hat making, lace making, basket making. The progressive Americans who are responsible for schools and for many other institutions in the Philippines claim that they have set a mark for all the world.

The practical turn of these schools may be judged by the recent establishment of a School of Household Industries for which 100,000 pesos was appropriated. This is a school for women. The first year 150 bright women were gathered up from as many districts and taught for six months in this school. Then they were returned to their homes where they were encouraged to form classes and demonstrate the home industries they had learned. Another assignment of women took their place and the process is continued with the idea of eventually having women in every district who know many of the secrets here taught. Could anything be more practical?

The climax of American encouragement of education in the islands has been, however, the development of the University of the Philippines. Beginning with a college of agriculture which studied and taught farming particularly adapted to the region, and with a medical college which specialized likewise in the disease of the region, this university is gathering about it such varieties of work as to call to it the attention of all the Far East. There are each year 2,000 men studying at Manila in this great school, and applications are coming from China and Japan and many other points for the privilege of entering students. It promises to become one of the great seats of learning of its part of the world.

Many Americans have the false impression that

all this is paid for by the United States. As a matter of fact there is but one expense in the islands that is borne by the United States, and that is the maintenance of the army which, viewed in one light, would need to be maintained anyway. The local government raises all the money for schools, sanitation, road building, carrying on the government, and all else.

The Philippine Constabulary, for instance, is the potent influence in the islands for the maintenance of law and order, and is paid for by the Insular government. The army is largely centered in a few posts and is not called upon except in case of major disturbances. But the Constabulary is scattered abroad in the land. It is to the Philippines what the Mounted Police is to Canada or the Rangers were to Texas in earlier days.

There are 5,000 men in the Constabulary. Most of the commissioned officers are army men from America. Many of them were "non coms" and went into the Constabulary when their terms of enlistment expired in the regular army. All the men in the ranks are natives, as are most of the non-commissioned officers and some few men in higher grade.

Every youngster in the islands wants to enlist in the Constabulary. The salary of $7.50 a month means affluence to a Filipino, and the possession of a khaki uniform is a glory that could never have been dreamed of before the Americans came. So the

youngsters come in out of the bush and, if they are strong and intelligent and willing, they may be enlisted, become affluent and learn to be a soldier while learning the ways of the white man and his language, for each post has its school for members of the Constabulary.

Six months of discipline performs the miracle of transformation and these youngsters are stationed in small groups under sergeants in every village. Here they maintain vigilance for whatever disaffection may develop, strike quickly when necessity requires, and call for help if the task is overlarge. Incidentally they keep an eye on the locally elected officials and report when there is a suspicion of anything like graft.

Members of the Constabulary are moved about with sufficient frequency to prevent the development of understandings with local officials. They all report to a central authority and this gives the government the equivalent of a corps of special agents to watch the entire island for misconduct on the part of its local politicians. It therefore becomes difficult for the petty politician to operate as he may, even in the States.

This check on local officials has enabled the central government to go much farther than it otherwise would and place these offices absolutely at the disposal of the natives. The legislature is elective but the upper house is made up of commissioners appointed from Washington, and so is legislation

checked when not approved by the United States. The governor is likewise appointed from Washington; and that post, incidentally, is the best paid position in the government of the United States next to that of the President himself, the salary being $20,000 a year. The entire Insular government is under the direction of the War Department through the Bureau of Insular Affairs.

After the American occupation began the death rate in Manila was something appalling, for here was a city of more than 200,000 people with no sanitation and practically no steps taken to prevent disease. It required some years for the development of a sewer system and a water supply but these were the first endeavors of the Americans. The death rate among babies under a year of age was at first around the appalling figure of 60 per cent. This has been cut in two since a water supply was secured. The records of deaths from dysentery and kindred diseases in the first years of the occupation averaged 3,558. In 1912 deaths from these causes amounted to 1,195, less than a third of the former number.

Among the villages of the interior, conditions were as bad. The trouble was generally a contaminated water supply. The Department of the Interior of the islands undertook the sinking of artesian wells. Already 700 of these have been sunk in almost as many villages. In some places the mere furnishing of this pure water resulted in a decrease of one-half

in the death rate. It is estimated that through this sort of sanitation, Uncle Sam is every year saving 10,000 baby lives.

In Manila is the Philippine General Hospital, an institution that is most modern and efficient in every respect. It would be difficult to find a better hospital anywhere in the world or a more fertile field in which it might operate. One of the important pieces of work that it is doing is the schooling of the greatest possible number of native women as trained nurses. There are fields of unlimited usefulness for these women in all parts of the islands. Dispensaries have been established in five of the provinces.

In all directions little hospitals are being opened and medical and surgical attention is being extended to these people who have never before known of such care. Such a hospital was recently opened at Bontoc, far up in the mountains, and it has been filled to capacity ever since. Every station is a center from which sanitation is taught. Every government agency, such as the school and the Constabulary, is made a force that teaches sanitation and leads to health. So thorough is the work that all these millions have already responded and, instead of being one of the pest holes of the world, the islands are becoming as healthy as is Panama or Peoria, Illinois.

An example of one of the remarkable demonstrations to up-to-the-minute government, is to be

found in the prison system of the Philippines. There has been established at Iwahig, on the island of Palawan, a penal colony. On three sides the mountains rise precipitously and on the fourth is the sea. It is a region from which escape would be practically impossible. So it is unnecessary to maintain prison bars or guards or any of the ordinary restraints that are thrown about men and women who are paying the penalties for their crimes. Instead of these is substituted an ideal farm demonstration plant and an organization for the teaching of other insular industries.

To this penal colony are assigned prisoners of good behavior from all the institutions of the islands. There are about a thousand men and women held here. They govern themselves as do the boys of the George Junior Republic of New York. Every individual is put into the sort of work for which he shows an aptness. He is taught a trade and allowed to share in the profits of his work. He may take a plot of land and farm it on the shares, under skilled direction. If his deportment is good he may eventually bring his family to reside with him. When his prison term has expired he may retain the plot of land as a permanent home if he so desires. Every influence is brought to bear upon him to make him a self-respecting and productive citizen. Iwahig throws down the gauntlet in all the prison institutions of the world.

The Insular Department of Agriculture is pro-

ducing a series of demonstrations of possible profits that may be received from native crops. It has shown the Filipino farmer how he may grow enough rice for the support of his family even without a caraboa, that native plow animal which was recently killed in such large numbers by disease. It has convinced the world that great regions in the Philippines are as excellent sugar lands as are the plantations of Hawaii. Sugar centrals are being established in different parts of the islands to mill the cane of the individual growers. Great sugar plantations are being established on what were once the friar lands, and to-day such scenes may be observed as a huge traction-engine stationed on each side of a great field dragging back and forth by cable plows that throw twenty furrows at each trip across the land. The Philippines, these experts hold, are soon to outstrip Hawaii or Cuba or Porto Rico in the production of this great staple.

The American government is performing this work of uplift with little assurance of the result that will be accomplished. The Filipinos nor no kindred race has ever been given this sort of opportunity and therefore the manner in which they will respond is entirely unknown. The Filipino individually and collectively has shown himself to be wonderfully apt to learn. In any kind of skilled work with the hands he has but to be shown his task once or twice and he has mastered it. He learns a language much more quickly than does an American

and in the ordinary studies of a school course the children are as quick as are those of the most progressive races.

Yet in the two centuries during which the Filipino has been in touch with European peoples and during which time certain members of the race have had opportunities for education and travel, no single great man has been developed. A few individuals of the race who have shown any degree of greatness have been mixed with Chinese or European blood. It is said of the full-blood Filipino that he is a skilled automaton, capable of learning any lesson that is set for him by another, but entirely without originality or initiative.

The representatives of the United States are not yet convinced that this is a fact. If such proves to be the case they hold that the Filipinos, located in one of the richest lands in the world, may still be made a most useful, productive, peaceful, and happy people. If the aroused Malay strikes afield for himself when supplied with the necessary information, he will be given an opportunity to develop for himself a nation in these South Seas and there is no gainsaying the lines of growth that may be followed by such a nation of such blood, for the experiment has never been tried since in the history of the world.

CHAPTER III

REVEALING WEATHER SECRETS

AT eight o'clock each morning the telegraph companies of the nation and of the world throw their circuits into the office of the United States weather forecaster at Washington. From that moment and for two hours thereafter this individual is in direct communication with nearly 300 observers. He is looped into Dutch Harbor where the Aleutian Islands reach out toward Japan. Manila is reporting. Panama is talking in code of the weather. Liverpool is telling of the state of the barometer in the neighborhood of the British Isles. Vardo, Astrakan, Nertschinsk, loop in by way of Russia and pick off the dispatches that are coming from Shanghai.

Every station in continental United States gets on the wire, sends in its report and listens to the weather news of its region as reported by all the other men on its circuit. Fifty ships at sea, under special contract, flash out their wireless reports of the weather conditions which are picked up by the great stations at Arlington and at Key West. A few hours later these same stations hammer back to sea a weather report of all the north Atlantic

ocean and every ship this side of Gibraltar may pick up the news. The forecaster draws his ninety-percent-correct conclusions from this mass of detail, makes his forecasts, his telegraphers begin sending instead of receiving messages, the infinite machinery for disseminating those messages is put to work, and the ninety millions know what are the weather probabilities for the day to come.

All of which operation has required the space of but two short hours.

This is the obvious purpose of the Weather Bureau. The public sees the results of these forecasts and occasionally gets a peep at the method of their making up. But the world-encompassing machinery necessary in accomplishing these results is seldom appreciated. Neither does the public know much of those other phases of Weather Bureau work that are less seen but none the less marvelous.

The present greatness of accomplishment of this service is one of the wonder stories of the government. The service that it performs applies so infinitely that the business of the nation would be upset if it suspended operations for three days. The money that it saves to the nation is almost beyond estimate; aside from which it is among the greatest life saving agencies in the world to-day.

It was the day before Thanksgiving some years back that the old side-wheel steamer, Portland, lay in the harbor of Boston ready to clear for her home port in Maine. Her sister ship at the same time

lay in the Portland harbor ready to clear for Boston. There was the tang of a New England autumn in the air but the day was clear and weather conditions ideal. The decks were full of people, all hurrying home for Thanksgiving dinner, an event dear to the hearts of these descendants of the Pilgrims.

At this moment came the flash of warning from the Weather Bureau at Washington to the effect that a storm was coming up from the Caribbean and should be expected to reach this part of the world in twelve hours. These warnings were disregarded by the captain of the Portland and he put to sea as though they had never been received. The captain of the sister ship in the Maine port, upon receipt of the same warning, refused to leave the wharf and turned a deaf ear to the entreaties of his passengers who were thus to lose the chance of Thanksgiving at home.

At midnight the storm broke. The next day came the news of the loss of the Portland and 150 lives, no person on board surviving. So was a most dramatic example given of the results of observing and disregarding Weather Bureau warnings. So was graphically, if tragically, shown the Weather Bureau's methods of saving life.

For thirty years the Weather Bureau has been extending these warnings of approaching storms. Generally they are strictly regarded by small boats to whom such storms are dangerous. The big

liners are aware of what to expect and are often able to so direct their courses as to avoid the storms.

Storms that affect the Atlantic seaboard may be forecast with almost mathematical accuracy. There are several sources of storms that may here prove dangerous. One is from Alaska, mother of storms, from which point they travel by way of Medicine Hat, the Dakotas, Cincinnati and points east. There is a week between the time the existence of such a storm may be known and its arrival in the Atlantic. There are observing stations all along the route reporting twice a day to Washington.

Another point of origin for such storms is the Caribbean, off the north coast of South America. Here the United States government sends its instruments for observation and employs men at the various cable stations to make readings and report daily during the hurricane season. In these waters ply also those ships which are in the employ of the Weather Bureau and which report all disturbances in their paths, the wireless messages being passed from one to another when the shore is out of reach. The coast stations that are found wherever Uncle Sam has a foothold, supplement these points of report.

So may a disturbance be traced for a week as it advances from the coast of Venezuela toward Galveston and is usually deflected around the point at Florida and on through the Atlantic. There is ample time for the warning of all mariners of the

approach of any of these storms and the number of good seamen afloat to-day who would otherwise be now in Davy Jones' locker is surely legion.

But recently the final step was made that spread the blanket of the government's storm warning over the entire North Atlantic. The great wireless stations at Arlington and Key West were impressed into the scheme and now reach out to sea twice a day to a distance of 2,000 miles and carry to all ships that are able to receive their dispatches the news of the storms that are brewing and likely to cause trouble.

The Weather Bureau keeps its finger on the pulse of every river in the nation. There is not a stream of importance in the country that can go on a rampage without Uncle Sam finding it out early in the game and tipping the facts off to those who dwell lower down, giving them from half a day to two weeks to make preparations.

If there is two inches of rainfall in the drainage basin of the Schuylkill River, the Weather Bureau immediately knows of it. It has the tables ready to show what effect that rainfall will have on the river flow and how high the stream will be at Harrisburg. It tells the Harrisburgers all about it.

When the great floods come in Indiana and Ohio, the Weather Bureau knows pretty well what is going to happen. It knows just how much snow there is in those states to be melted by the rains. The

measurement of snows is a part of its work. It knows what is the rainfall and adds just as much to the water to be carried by the streams. It has been reading gages on those streams for many years and knows to just what extent they will be able to carry those waters.

So they immediately begin sounding the alarm at all points downstream. The result is a degree of preparedness.

Low down on the Mississippi those men who attempt to hold the levees against the floods, are told two weeks in advance of the high waters that they should expect. At certain points these figures may show that the levees will be inadequate. Strenuous efforts may be made at reinforcement and often these save great areas, laden with rich crops, from inundation. Again there may not be sufficient time and labor available and the levees break when the big waters come.

But to revert to the herculean task of gathering the weather reports of the nation every morning, basing forecasts upon the facts as shown, and distributing this information to the whole people.

There are 200 principal stations in the United States. Reports from these 200 would pick up any weather disturbance in the country that was of importance. These stations all hitch up by wire with Washington at eight o'clock each morning. This is done by prearrangement with the telegraph companies with whom Uncle Sam spends $275,000 a

year for the service. All the stations in a given region get on a certain circuit. It takes but ten circuits to cover the entire country.

One circuit, for instance, would cover the South. Houston, New Orleans, Atlanta, Richmond, and a score of others would be on that circuit. Houston begins reporting at eight o'clock. All the other stations on the circuit hear what Houston reports. New Orleans then begins. Every station on the loop listens to New Orleans; and so on until they have all reported. In sending to Washington, each of these stations has also reported to every other in its district and each has all the weather news of its section. Washington will not have to wire this detail back. The same is true of each and all of the circuits. Each station has the detail of the weather in its region as soon as Washington has it.

In the central office at Washington an expert sits over a map on which he instantly records every detail of the report as received in a graphic way which carries to the man accustomed to reading a weather map the whole story of the weather situation throughout the country. From the conditions as they exist to-day, as compared with those as shown by the map of yesterday and of the day before, the forecaster can tell just what is happening and can forecast, with a reasonable degree of accuracy, what will happen to-morrow.

There are two principal clues to the weather, these being the low and the high barometer or air pressure.

LEVEE BREAK, FORECAST TWO WEEKS IN ADVANCE

AN INDIAN SCHOOL IN THE SOUTHEAST

The low barometer means warm weather with rain or snow and winds. It is the sign of the storm. The high reading of the barometer signifies cool and clear weather. When the air pressure is low there are partial vacuums created which causes the rushing in and up of the air and therefore winds and rain. The low barometer, sign of the storm, nearly always appears first in Alaska and the Canadian northwest and it is from this quarter that practically all of the important weather changes come except the typhoons from the South.

The observer sees on to-day's map a "low" for Toledo. On yesterday's map this low appeared at Chicago, the day before at Winnepeg, and the day before at Edmonton. It is easy to observe the advance of the storm. It will reach Buffalo in twelve hours and New York in twenty-four. This is almost a certainty but there is always the possibility of its being deflected by some cross current or of its wearing itself out. Behind the low barometer and the storm always comes the high barometer and the cool, clear weather. The maps always show a procession of these chasing each other across the country.

It is from the showing of the map of to-day's weather conditions as revealed from the stations reporting, as compared with the maps of the days immediately past, that the forecaster determines what is going to happen in the given localities. He reads off the forecasts for a hundred different dis-

tricts as readily as the broker reads the quotations from his ticker.

Then comes the no less monstrous task of getting this forecast to the whole people as quickly as possible that they may make the greatest amount of use of it. The central office at Washington attempts to let the ninety millions know what the weather is to be for twenty-four to forty-eight hours in advance.

It is aided in this by the fact that weather is news. People are more prone to talk of weather than anything else. More people read the weather forecast than anything else in a newspaper. Therefore the great press associations are anxious to get the forecasts. They convey it to their subscribers from one end of the nation to the other and these rush it into print in their newspapers. The Weather Bureau is thus aided in performing its purpose. Thus is the mass of the people, particularly the city dwellers, reached with a fair degree of promptness.

But the Weather Bureau does not depend wholly on this indirect method of getting its weather reports to the people. Nor does Washington attempt to handle the entire job. It calls for help that the forecasts may get back more quickly. It covers the eastern half of the nation. Chicago forecasts for eleven states in the northwest, New Orleans for a southern group, Denver for the central mountain plateau and San Francisco and Portland for the Pacific coast. When the reports have come into these six cities

and the maps have been made and the forecasts for the different regions recorded, the machinery that has brought in the information is reversed and the forecasts are sent out over the different circuits. So does each station get its forecast direct and each has its own way of making use of it.

Every station has forecast cards that it stamps with the weather message of the day and distributes to individuals and institutions asking for it. These go out to all postmasters in the district. Many postmasters have their own methods of duplication. They are provided by the Weather Bureau with rubber stamp outfits from which they can make up the given message and duplicate it on any given number of cards. These cards are sent out by rural letter carriers and posted in conspicuous places.

There is hardly an individual farmer to be found in the United States who can not have this weather card every day for the asking. Through this postmaster and the Weather Bureau he may have it delivered each day, probably within four hours of the forecast and yet good for a day and a half of the future.

Then there is the telephone as an auxiliary to the distribution of the forecast. Practically all telephone systems in rural communities receive the forecast cards which they place before their exchange operators with instructions to repeat them to whatever subscribers ask for them. Still other companies

plug in all the lines at a given hour each day and send forth the forecast and whosoever desires may take down his receiver and find out what Washington says about the storm gods.

But these are not all of the benefits that the Weather Bureau hands out to the folks back home. There are the special reports of weather conditions in the cotton-growing region and in the wheat and corn region during the season of crop development. Those men who sit behind mahogany desks and wax wealthy through manipulation of the crops of the farmer, have their own machinery for knowing what are the weather conditions. The farmer has long been without this information and was therefore at a disadvantage when endeavoring to reach a conclusion as to whether or not he should hold his produce for a higher price. But now the Weather Bureau stands ready to extend to any individual farmer in given sections a daily report of the weather in his part of the world and in all other regions producing his kinds of crops.

Take, for example, the wheat farmer of central Kansas, living four miles from a village. There are twenty stations in Kansas that report to Kansas City. Each of these report high and low temperature, rainfall and condition of the weather at time of reporting. These are all scheduled and tabulated. There are other wheat centers such as Omaha, Chicago, Minneapolis, Columbus. Each of these gets a similar report and each transmits a report

of average conditions in its district to Kansas City. Then a slip is made out that shows the detail of the report for Kansas and the general averages for the other wheat districts. This is the slip that any farmer may have every day for the asking and so may he personally check up crop possibilities and determine whether to sell or to hold his crop.

Any individual may add to his daily receipt of the forecast card the weekly report on weather conditions published at Washington. This makes the record of what has transpired. It is enlarged into monthly reports and finally compiled into an annual. This annual record of what has transpired in the way of weather is valuable as a historical document, as future generations may want to determine whether the world is getting wetter or dryer or the old men of to-morrow may want to know whether it was raining on the day and at the place they were born.

Then there is the regional bulletin. When, for instance, there is a great influx of people into a section like South Texas or California, there are many people who want authoritative information as to climatic conditions there. The government has a bulletin that gives the facts as to climate about any part of the nation. This bulletin it issues, free of charge, to anybody who asks for it.

These are but a few of the important things that the Weather Bureau is doing on the big job. There are many others, among the most interesting of which may be mentioned the survey of the upper

air. Box kites and captive balloons, with instruments attached, are being sent up four miles and the records of rarity of atmosphere, degree of moisture, temperature, direction and velocity of wind, are being recorded. Free balloons with similar instruments have been sent to an altitude of eighteen miles. The study of the conditions that exist in this upper air and of its movements may lead, the scientists believe, to an understanding of storm production that will make it possible to forecast for a week instead of two days.

In the meantime the public is learning more and more to make use of the Weather Bureau. Transportation companies, for instance, refuse to ship bananas without special provision for their protection when the temperature in the car is less than fifty-five or more than sixty-five degrees. The amount of refrigeration to be furnished for fruit, vegetables, eggs, meat, fish, and all such merchandise, is based upon the forecast of temperatures during the period of transportation. A carload of California fruit might be spoiled as completely if subjected to a freeze in coming east as it might be by weather that was overwarm.

Delicate truck crops are covered up in advance of a storm to prevent frost from killing them. Cranberry bogs are flooded and thus are harvests saved. Potato digging is suspended ahead of the storm and the potatoes already out of the ground are housed. Sugar-cane is cut and put into the windrow. The

ice man prepares for the cutting of his stock in trade. The maple sugar producer gets his first hint of the rising of sap from the weather forecast. The raisin grower, whose grapes are laid in the sun, protects them when rain is forecast. The producers of moving-picture films schedule their operations in accordance with the weather predictions. When great snows are forecast on the continental divide region the railroad companies send out the snow plows and light freight trains. Ranchmen house their cattle in advance of an oncoming norther. All the world of picnickers ask the Weather Bureau for advices in advance of their outdoor engagements. Marine insurance companies refrain from assuming risks on cargoes when a storm is predicted. Fishermen pull in their nets and protect their boats. Stockmen in such regions as the swamp-lands of South Carolina drive their cattle into the hills upon receipt of warnings of the approach of high water.

In fact, the practical uses of the Weather Bureau have come to be legion and are increasing in number every day. That all those people who are making use of the various forms of information furnished by the Weather Bureau may receive an ever improving service, Uncle Sam is laboring valiantly year after year to make this branch of federal work always more and more efficient.

CHAPTER IV

RECOMPENSING THE INDIAN

BECAUSE it robbed him of an empire, the federal government is nurturing the American Indian as carefully as any hothouse flower an attempt to make him an upstanding citizen among his white fellows.

To this end it maintains in Washington a great governmental bureau, the Indian Office, to look over the infinite detail of his affairs. Through this office there is annually spent $10,000,000 in his interest, while his vast income is administered as would be that of a pampered child. He is given common schools and colleges, lands and cattle, medical and moral supervision. His affairs are given infinite attention, he is protected from spoliation, he is led into the ways of productiveness and self-dependence.

This is no mean task, for there are 300,000 Indians and each one of them must be given individual attention. Each one has property, each has problems, each is facing a condition of life for which all the ages behind him have given him no preparation. To administer the estate of these Indians, scattered throughout the nation and rich beyond com-

pare, to care for each ward as painstakingly as would the intelligent parent for his own child, to work out the ultimate solution of this, one of the most vexing questions of the nation, is one of the gigantic undertakings of Uncle Sam.

It all goes back to that time when the Red Man was in undisputed possession of all the land from ocean to ocean, when its streams swarmed with fish, deer trooped abundantly through its woods and limitless buffalo herds roamed the virgin prairie. The lodge of the Red Man was pitched wherever bountiful nature provided most easily for his wants. He possessed such reaches of land as were beyond any possibility of his use.

The white man came and took it all by force. The Red Man was driven back and back until he had only such lands as no white man wanted. Might made right. The Indian was grievously wronged and the whites of this generation confess the injustices. Seeing the greater aspects of world necessity of more complete use of world resources, they justify themselves. The people of the earth needed the latent produce of these lands. But the Indian nevertheless was grievously wronged.

For a century the two races were at war. Finally there remained no Indians that were not brought into subjugation and placed upon restricted reservations. The Indian as an active enemy no longer existed. He had become a ward, a virtual captive. The nation ceased to regard him in the old light. With

the passion of battle gone, his case could be viewed calmly. A balance was struck and the white man found himself irreparably in the debt of the rightful owner of America. Now he is trying to pay the debt.

Then there followed a half-century during which the Indian was kept on his reservation and furnished rations. To be sure, his wants were provided for, he did not even have to work or hunt nor do aught else for his livelihood. All necessity for and possibility of doing aught but doze in the sun, was removed. This was the period of the Indian's decadence.

At this time an appreciation of the injustice of robbing the Indian of his lands began to dawn. The inhospitable regions into which the aborigine had been driven and where he was assigned reservations, began to grow through governmental action and include better land. Many Indian tribes were allotted broad acres of fair land and given titles to it from the government. To be sure, these lands had practically no value at the time, but as settlements have pushed westward, all this has changed. The coming of the white man has given the remnant of land left to the Indian a money value that all his domain would not have possessed had he been left in undisputed possession of it.

In fact, the Indian is the greatest land owner in the nation to-day. He owns more timber, more coal, more oil, more cattle than any other individual

in the United States or in the world. If his assets are carefully enumerated he is found to possess, roughly, $1,320,000,000 in wealth.

If this property were divided equally among the 300,000 Indians remaining, each would be the possessor of about $6,600. The census returns show that the wealth of the nation, if divided equally among its citizens, would give each about $1,000. So it is seen that the Indian in the United States is about six times as wealthy as the white man. Yet the average American is the possessor of such wealth as to make all the world jealous and to leave him without a financial peer.

This wealth of the Indian is mostly in land in the West. Ten years ago that land was not worth one-half its present value. In another decade, it may have again doubled in price and this process of increase will unquestionably go steadily forward. So does it seem probable that the Indian will steadily gain in his lead over other men as the possessor of most of them all of this world's goods.

The Yakima Indians, residing in the State of Washington, are, for instance, the possessors of 120,000 acres of land that is covered by a new irrigation project of the government which has given that land a value which runs from $100 to $200 an acre.

In Washington also there is, on the reservation of the Quinielt Indians, a forest which contains prime standing timber ready for the ax which is valued at $13,000,000. The sturdy fishermen of the tribe will

have this money to their credit as soon as the timber is sold.

The Klamath Indians in Oregon, a kindred tribe, own a forest that is estimated as being worth $27,000,000. A railroad has just been pushed into this region and the cutting of this timber is soon to begin.

Down in Arizona, the Apaches, last of the warlike tribes, have standing timber worth $10,000,000.

Every man, woman, and child among the Osage Indians, in Oklahoma, has an income of $600 a year from oil leases alone. For each of these Indians the government holds a trust fund of $3,800 in cash from former land sales. Aside from which they have their homes and stock and various other property and resources.

On the lands of the Five Civilized Tribes there is in one year produced $10,000,000 worth of oil, of which one-eighth came back to the Indians in royalties. Already $100,000,000 in oil has been produced on Indian lands in Oklahoma and the fields have been but partially developed.

On scores of reservations, lands have been sold and the money received deposited to the credit of the Indians. There are whole tribes of Indians who thus have amounts in bank as high as $10,000 and $15,000 for every individual member. There is $55,000,000 in cash standing in bank and cared for by the Indian Office to the credit of such Indians.

But the Indians can get their money only on

certain conditions. Through the ages they have been a wandering people to whom any accumulation is a burden. All their possessions have been habitually discarded at moving time. They lived abundantly from the kill of the day and shunned burdensome possessions. Their native tendencies are, therefore, to give away rather than to retain. The Indian will fill the lap of the casual visitor with his most valuable possessions.

To a people possessing this financial policy as a heritage, little would be accomplished by giving them large sums of money. Their funds are, therefore, taken care of by the Indian Office until the time arrives when they have learned something of their use. Each individual is carefully studied by the Indian agent under whose supervision he comes. If the Indian asks for money, the agent makes a report on his capability for using it and the purpose for which it is to be expended. If the Indian wants to build a house, or buy livestock, or start a farm, or do any of a thousand advisable things, he is provided with the necessary funds. But the bureau sees to it that he is not allowed to fritter away his cash.

So does the individual Indian continue the ward of the government until he has established his ability to take care of himself. When he demonstrates that ability his affairs are gradually turned over to him. First he is allotted his land. When he shows his ability to care for it he is given a title and with that

title comes citizenship and the right to cast his vote like any other good American. His moneys are then given to him as his needs present themselves and as he deports himself creditably. Eventually he walks alone, performing every act as does any other citizen of the republic. But in the meantime the infinite detail of administering the affairs of these 300,000 minor heirs must be looked after by Uncle Sam.

The Indian Office attempts to master the endless detail of this task. Its management has been developing steadily toward getting the affairs of the Indian on a business basis. But it is probably a bigger task than would be the handling of the affairs of a billion dollar corporation. The human element enters everywhere and it is a groping human element that finds its way with difficulty in the half-light of its civilization.

I was one day in the office of the Commissioner when he received a telegram which he handed to me. It announced the lease of 10,000 acres of oil land on the Osage Reservation. The Indian Office had issued proposals for the lease of this land, a royalty of one-sixth of all oil produced to be returned to the Indians. The old proposals had called for but one-eighth. Upon this new basis, the public was asked to bid for the privilege of taking the lease. The telegram stated that the lease had been awarded to the highest bidder and that $480,000

had been received as a bonus for the privilege of taking the lease on the one-sixth basis.

This is an example of the tendency to place the affairs of the Indian on a business basis and get the market value for what he has to dispose of.

The government holds that the Indian comes nearer fitting into the business of stockraising than any other calling of the white man. Most of the reservations are, also, in regions where there is plenty of good range. It is, therefore, determined that every encouragement shall be given to the man on the reservation to develop herds.

Again, while I was in the Bureau, an order was issued authorizing the purchase of 9,000 head of cattle for the Crow Indians. Most of these were to be high-grade Herefords for breeding purposes, but there were to be certain steers that might be marketed in a year or so to demonstrate the possibilities. All were to be established on the reservation, cared for under government supervision, and made a demonstration plant for the men of the tribe. Incidentally they were paid for out of tribal funds, for the Crows had been selling a lot of valuable lands. Here was a business operation combined with the idea of leading the Indian into a self-supporting occupation.

The whole tendency of the government's supervision of the Indian is directed toward giving him the industrial idea of the white man. The government holds that the Indian must adjust himself

to the white man's way of life or he will not survive. The problem is a difficult one, for it means the making over of a race in a single generation.

The school is probably the most potent influence toward the desired end. There are in the United States 70,000 Indian children of school age. They are located in twenty-six states and upon eighty reservations. For these children, there are maintained 325 day schools, all of which specialize on industrial courses. There are seventy-five boarding schools on reservations where the children are taught to live in accordance with civilized customs. In addition to these there are thirty-five great industrial schools such as that at Carlisle, Pennsylvania; Haskell, Kansas; or Phoenix, Arizona; which are turning out hundreds of well and practically educated young Indians every year. In all of these schools there are to-day in attendance about 30,000 Indian children. There are, in addition, the schools maintained by the various churches.

All this education is industrial, but there are many things that work against its always accomplishing the desired result. The first of these is the return of the student to the reservation where he enters the old life which has no opportunities for him to use his new knowledge. I met on the Blackfoot reservation in Montana, an Indian who, fifteen years before, was the most famous quarterback that Carlisle had ever produced and who won national note

in his play against the great colleges. He was graduated from Carlisle but he has gone all the way back to the aboriginal and no one would dream that he had ever been off the reservation.

Another of the influences that work against the Indians' becoming productive is their wealth. When a family of Osages numbering six each receives $600 a year from oil leases, a total of $3,600 for the family which lives very inexpensively, there is no need of exertion on the part of any member. The very prosperity of the tribes makes the task of their development the more difficult.

But the federal government is earnestly wrestling with all of these problems with a determination ultimately to solve them.

Disease stalks abroad among the Indians. Its prevalence is a source of great worry to the government and every effort is being made to lessen its ravages.

Tuberculosis is among the most dreaded of the Indian diseases. It is estimated that there are now 30,000 cases among the Indians of the United States. This means that one Indian in every ten is affected. Of all the deaths on the reservation, 32 per cent. are due to this disease. This is a striking percentage, when it is known that only 11 per cent. of deaths among whites are caused by tuberculosis.

There are a number of reasons for the prevalence and the fatality of this disease. In the first place, the Indian as a race has never had the disease.

As a race he has not, therefore, become able to resist it as do the whites. Again, the Indian has but just been put into the white man's house and does not know how to use it. He closes up every crack and cranny and lives constantly with the least possible amount of ventilation. In the third place, the Indian is a fatalist. He believes that what will be will be. He, therefore, lends no aid to his own cure. He takes no interest in efforts looking to his recovery, fails to take medicine as prescribed or live as directed.

There are about one hundred physicians employed by the federal government to work among the Indians and fifty more who look after certain reservations under contract. Tuberculosis camps and hospitals are being established on many of the reservations but the big problem is by no means solved.

Another dread disease that has recently been found to be running riot on the reservations is trachoma. There are 80,000 Indians in the country suffering from this curse of the immigrant, the presence of which has cost many a poor European the privilege of coming to America. In Oklahoma, it is estimated that 70 per cent. of the Indians suffer from trachoma.

Congress has appropriated $200,000 a year for the fight against trachoma. Surgeons who are experts on trachoma are assigned to given districts. These men travel about and instruct local doctors in the

care of this disease of the eyes. All these will be made expert in its treatment. They will fight against it until it is eventually crowded off the reservations. So does Uncle Sam perform another great service to the Indian and pay one more mite toward recompense. He has also put a corps of dentists in the field who will visit every school and fill the teeth of all pupils free of charge.

In that wild region of the Rockies where the four States of Colorado, Utah, Arizona, and New Mexico come together, reside the Navajos, the model tribe of them all. These Indians have a reservation as big as Connecticut with Vermont thrown in. The canyon of the Little Colorado cuts across it and makes it a riot of grandeur. The Moquis, famed for their snake dance, are in the Navajo family, as are many other of the highly intelligent Indians of the neighborhood.

These Indians had been farmers and users of water for irrigation before the white man came. This manner of life had given them the idea of property value. The Spanish Fathers, three centuries ago, gave them domestic animals—horses, cattle, sheep and goats. They took kindly to their care and developed herds of great numbers. A recent survey of the livestock of the Navajos showed that they had 300,000 horses, 30,000 cattle, 1,500,000 sheep and 300,000 goats.

It is estimated that they annually clip from their flocks half a million dollars' worth of wool. The

blankets that the Navajos weave have a national reputation. Their herds graze far from home and are carefully tended. Many of the members of the tribe are wealthy in livestock through their own efforts. The government is now buying and giving these Indians good-blooded animals to improve the grade of their stock. Artesian wells are being put down that the unwatered grazing lands may be used. Every encouragement is being extended the tribe that is deporting itself in such a way that the Great White Father would like to have all his Indian wards follow the example.

These and other Indians of the Southwest are grasping opportunities for farming that are being extended through the establishment of irrigation facilities. Some millions of dollars have been spent in the last decade in bringing water to the lands of the Indians and thus making the best sort of farming possible for them. In the Southwest they respond to these opportunities, but the Indians of the North, accustomed to the roving life of the buffalo hunter, grasp the farming idea less readily.

From this brief summary of present conditions it may readily be seen that the Indian problem has not yet been solved. It is estimated that 30 per cent. of the Indians of the country have been fairly well started on the road toward making a part of the white man's civilization. The 70 per cent. are yet beyond the desired influence. There are individual Indians who have attracted national

attention and have deserved it. But these are the great exceptions and should not be taken as an indication of particular ability on the part of all the members of the race. The mass of the work is still ahead, the government realizes the size of its problem and is earnest in its determination ultimately to work it out.

It is one of those great tasks which is philanthropic in its nature, which has as its object a great work of uplift without profit. The American government is fond of just such unselfish tasks and is laboring valiantly upon a number of them. The existence of these works and the benevolent and unselfish desire to do good on the part of the old gentleman who is Uncle to all Americans and who typifies the government are such as to give the busy Yankee a bit of a heart-swell of pride when he occasionally looks behind his governmental curtain.

CHAPTER V

TRANSFORMING WESTERN DESERTS

UNCLE SAM in the guise of the federal engineer has waved his magic wand over a million parched and thirsty acres of desert land in the West, where grew the nondescript sage-brush and wandered the solitary coyote, and lo! the prosperous farmer is abroad with his clicking mowing-machine and big red apples are falling into the laps of his children.

This governmental Moses has smitten the rock at the rim of the desert and a river has gushed forth to water the valley, for the blow of the giant drove a tunnel six miles beneath a mountain and sucked a torrent dry. Where the erosion of time has eaten mountain ranges in two, the governmental titan has welded them again together with cement dams behind which have grown great lakes that have held flood waters for use when rains come not. Rushing streams that have run unceasingly to the sea while the lands on their banks have lain barren from an age-long thirst, have been diverted and have wooed a flowery wealth from forbidding nature.

In every case a transformation has resulted.

Wherever waters were made captive, canals grew. These ditches always led to lands that were thirsty but in whose virgin laps lay such productivity as is to be found only in the unsullied desert. Everywhere settlers have awaited the coming of the water. Their shovels have directed it to the lands where the seed have already been planted. The only element lacking, moisture, has thus been supplied and wheatfields have taken the place of desert growth and fat cattle munch their cuds where formerly scudded the horned toad.

The federal government has been engaged in the work of reclaiming deserts only since 1902. In that time it has expended a hundred million dollars and the work is half done on the projects already laid down. It was in 1902 that the Reclamation Service came into being, Congress having provided for it and set aside for its maintenance certain moneys coming in from the sale of public lands. Even then the government possessed much land in the West that was selling very rapidly to settlers, the income from this source which went into the Reclamation fund amounting to about $7,000,000 a year. As choice lands steadily grew scarcer, sales fell off and the income grew less and the government was forced to issue bonds against the land for its reclamation.

There are, however, twenty-eight great projects scattered from Canada to Mexico, and from the Missouri River to the Pacific coast which are being

carried steadily forward to completion. Half of them are already practically done. When the construction of all is finished, there will be 5,000 square miles of this desert land spreading out invitingly and ready to be transformed into a region of the most intense productiveness of any to be found on the continent. This area, irrigated by the works of the federal government, will be about equal in size to the State of Connecticut. It will furnish model farms to 62,000 families, or more than a quarter of a million of people.

But these tasks for titans that are making over Nature's map! How are they performed? Let us have a look.

A decade ago, there rushed through the precipitous mountains of Colorado, a torrent which for the span of a lifetime had defied mankind. The Gunnison River had cut its way a mile deep into a rocky gorge and its swift flowing water broke into treacherous rapids and plunged over many a bluff for falls for hundreds of feet. Through all the reach of the stream there were no agricultural lands, no grazing lands, no power possibilities—nothing for which the stream could be used. At one point the river flowed at the foot of a mountain beyond which, six miles away, there spread a virgin desert, made barren for lack of water.

Some daring government engineer conceived the idea of driving a tunnel from the valley to the bed of the mad river, of stealing it and of bringing it into

the valley where it would cause the development of such prosperity that races to come would call it blessed. These engineers rode down the Gunnison Canyon on mattresses inflated with air, negotiated its waterfalls, explored its entire length. Finally, they located a camp where the town of River Portal afterward grew and from which point the six-mile tunnel through the rock was started. So deep was the gorge in which this town was planted that the sun shown but twenty minutes a day in its journey from east to west.

A road to bring machinery and supplies to River Portal had to be cut in the solid rock of the mountain-side. Labor and supplies were obtained with the utmost difficulty. Yet soon the great drills were being worked by the hardy miners and from each side of the mountain the tunnel grew until it met beneath without the sixteenth of an inch variance from the manner in which the engineers had planned that it should. This tunnel was eleven feet in diameter. There is no other tunnel in the world six miles long. It cost $3,000,000 to make it, but beyond the mountains to-day spreads the Uncompahgre Valley, blooming with roses, producing apples and peaches such as are grown only on the western slope of the Rockies, yielding larger returns in potatoes, in alfalfa, and in grain, to a region where all these things are greatly needed. The stolen river has worked the miracle.

Probably the most striking feat of all was accom-

plished where the floods of the high mountains of Arizona used to reach the sands of her desert, run rampant at certain seasons but leave vegetable life impossible at others except through irrigation. For the Roosevelt Dam has stopped their flow and made them prisoner.

In the Tonto Basin, where thirty years ago sheepmen and cattlemen met in the greatest warfare of its kind that the West has ever known, was laid down the plan for this great reservoir. Across the mouth of this basin, to a towering height of 280 feet, has been built a great concrete wall which measures 1,080 feet on top, and which unites the points of two mountains which the torrents had cut asunder when the world was young. In building this dam and the canals that run from it and the roads that lead to it and the power plants that have been incidental, there has been expended ten millions of dollars.

Yet the miracle wrought is such that no one can doubt the wisdom of this expenditure. Back of this dam are two valleys, one twelve miles and the other fifteen miles in length, and each from two to three miles wide. These have been transformed into a lake 200 feet deep in places and containing enough water to cover the State of Delaware one foot deep. This reservoir when full has a capacity sufficient to fill a canal 300 feet wide and nineteen feet deep, extending from Chicago to San Francisco. It would submerge the entire city of Chicago, which embraces

190 square miles, to a depth of eleven and a half feet.

Forty miles below this dam spreads out the valley of the Salt River, an oasis in the desert waste sixty miles long and thirty miles wide, which under the influence of this stored water yields up such returns from the soil as is beyond the comprehension of a man who knows farming from the standpoint of the East. Six crops of hay are cut each season in this valley and two tons to the acre are ordinary yields. Ten acres is enough to support a family. A densely settled farming community that defies the world as a place to live has grown up in this region from which the desert stretches for a thousand miles in all directions.

In the State of Washington, on what is known as the Yakima project, Reclamation engineers have performed another fantastic feat which is a new thing in engineering. They have built a canal in the valley and lifted it span by span to the mountain side far above, where they have placed it in a nook, linked it together and driven through it the torrents of water that make a great plain fertile.

There were twelve miles of this canal that had to be so constructed. The reservoir that stored the water was at a level above the plain which was to be irrigated but the only way to the plain was along the steep side of the mountain. The engineers realized that a canal in such a position, were its water ever to escape their control, would tear such a

gash down the mountain as to make its mending practically impossible. They decided to put it in a concrete trough from which it could not escape.

In the valley below the hillside great molds were made and concrete poured into them in such a way as to make sections of the canal which would be eight feet across the top and six feet in depth. A trolley was swung from the mountain top to the valley below, and as these links in the canal were completed, they were swung up the trolley and welded one by one into this twelve-mile trough. To-day the water is flowing through it and the plains which they irrigate are producing great quantities of those apples that made Washington famous, and of hops which here grow to perfection.

The Colorado River, the Nile of America, after cutting the greatest of gorges, the Grand Canyon, emerges upon the flat lands of southern California and Arizona and bears great floods of muddy water to the Pacific. For hundreds of miles toward its lower reaches, it is bordered by the great Colorado Desert, dryest of all Uncle Sam's lands.

To divert this muddy flood on to these lands was one of the earliest undertakings of the government engineers, and this task, to a certain extent, they have completed. Ten miles above Yuma, in the southwestern corner of Arizona, these engineers planned to lay down a dam that would raise this great river to such an elevation that its water might

be diverted into canals that would flow on to the mesas.

As deep as they might dig, they found only sand as a foundation upon which to place a structure intended to accomplish this purpose. Upon such a foundation, the concrete dams that are usually built might not be laid down, so a lesson was learned from the Indians who had lived thousands of years among those sandy streams and had discovered some of their secrets. A structure known as an Indian weir dam was built, bedded in the sand and reaching a distance of half a mile across this mad and muddy stream. It was a great fight to put down this dam while the never-ceasing water rushed by, but in the end the task was accomplished and the project came into operation.

From this dam the water might be diverted to the California side but not to the Arizona side. In the face of this difficulty, a second unprecedented thing was undertaken by these government engineers. Bringing the water to a point on the California side opposite Yuma, they determined to siphon it under the great stream and bring it again to the surface on the Arizona soil. Huge caissons were driven which lead the canal far underground. At this low level, the tube which was to form the aqueduct was pushed through the sands below the Colorado River until it had reached the Arizona side. Here again a great shaft was sunk which connected with the tunnel, and through this the canal was again brought to the

surface. The siphon laid down was 930 feet in length and fourteen feet in diameter, and carried beneath this great stream enough of the life-giving water to build a little empire in this corner of Arizona where grow the dates and figs and citrous fruits, competing with the valley of the Nile, whose reputation for fertility comes down in legends of old.

The highest dam in the world is located in northern Wyoming. When the springtime showers and sunshine fall upon the snowy peaks and lofty mountains of the eastern rim of the Yellowstone Park, thousands of streams rush downward and fill to brimming the swift-flowing Shoshone River. This flood, which for ages has gone on unchecked and uncontrolled, now sends its strength against a massive wall of concrete with which the government engineers have blocked the canyon. A beautiful lake one hundred feet deep and covering ten square miles is the result. In the remarkable gash that the Shoshone cuts in the mountains with perpendicular walls 1,000 feet high, the government has erected this dam. It is a wedge of concrete 238 feet from base to top, yet so perpendicular was the gorge in which it was built that it is only 200 feet long at the top.

But the glory of the Shoshone Dam is soon to be lost; for in Idaho, twenty-three miles from Boise, is being erected the Arrow Rock Dam which will have a height of 351 feet and which will therefore surpass the former record-breaker. To get a foundation

for this dam, it was necessary to excavate to a depth of ninety feet; and to assure themselves a sufficient base for the great structure, the engineers cleared off the bedrock for an area of one acre, and from this base, to a height of 351 feet will rise the solid mass of masonry.

But what is to be the largest dam in all the world is taking shape down in New Mexico. The waters of the huge drainage basin that are led down to the sea through the Rio Grande are to be blocked in their progress a few miles above El Paso and there is to be formed such an artificial lake as exists no other place on earth. The New Assouan Dam in Egypt, which has long boasted the greatest storage capacity of any such structure, contains when full, enough water to cover 2,000,000 acres to a depth of one foot. The Elephant Butte Dam in New Mexico will have a capacity 50 per cent. greater than this, its nearest rival. 3,000,000 acre feet of water will rest back of it when filled and pour out at call this vast quantity of life-giving moisture which will bring fertility to desert lands in New Mexico, Texas, and across the border in Mexico itself, for the enterprise is partly international.

There would be enough water stored here to cover the city of Greater New York—Bronx, Brooklyn, and all—up to the second story of its multitude of buildings and would make business possible only through the use of boats. Were it applied to the District of Columbia, the capitol city of the nation

would find itself submerged to a depth of a hundred feet, with only the Capitol, Washington Monument, and a few such landmarks sticking out of the flood.

This climax of irrigation is in the land where the people of Montezuma were thus using the water when the Spanish Fathers first brought the gospel to the natives. Here was the very germinating point of the whole idea of irrigation so far as the United States is concerned; and here is this great development to be interposed upon that sytem of old.

At a score of places where these reclamation projects have gone in, the waters that rush from them and tumble over falls in their canals have been harnessed and are now generating such quantities of electricity as to supply the country with cheap power for hundreds of miles around. At the Roosevelt Dam, there is a great power house which furnishes electricity for Phoenix and Mesa; for the operation of pumps that lift the water from desert wells to make the lands of certain Indians fertile; and powerful currents that operate huge mining processes in such great copper producing regions as those which surround the town of Globe. One mining company at Globe pays to the government $400,000 a year for electric power, and this sum is almost enough to pay the interest on all the money invested in the project.

At Yuma, a drop in the canal generates sufficient electricity to lift the water to a higher level at a point lower down and convert a burning mesa into

a series of lemon groves. The Huntley project in Montana gives a demonstration of a canal which lifts itself by its own boot-straps. At a certain point on this canal, there is a waterfall and above it there is a plateau that requires irrigation. The government has installed a power plant at this point which works automatically without even the necessity of the presence of an attendant. The fall generates the power which lifts a part of the canal to the heights above as other portions of its water go tumbling down the stream.

On the Truckee-Carson Project, the Strawberry Valley Project, and various others, electricity is generated and used for whatever purposes local needs may require. As all these projects will eventually be owned by the farmers who use the water, this electricity is also their property to be used for street-car lines, electric lights, local industries, telephones, all manner of enterprises that require this sort of power. These will be supplied with it by the community itself and at a price that is nominal. So are the oases in the desert becoming demonstration plants of the most modern use of water power, and of the community ownership and application of that power.

All these things have been accomplished in a decade. Their accomplishment has not been without local strife and dissatisfaction, and an occasional suggestion of mismanagement, and even of fraud. But they have all demonstrated the

correctness of this policy of making myriads of blades of grass grow where none grew before. They have shown the possibility of calling into being many thousands of the best sorts of homes for the use of corresponding numbers of good American families.

These engineers who have grappled with Nature in her most forbidding guise and have come off with the laurels are, however, looking into the future and seeing visions of yet bigger things that may be accomplished. They look upon the Columbia River which rolls through those vast reaches of Washington and Oregon, cradled in a gash of the earth 200 to 300 feet deep, which offers no possibility of being dammed. Yet on the mesas and plateaus above this stream are great quantities of barren lands which cry out for the floods of water that it carries unused to the sea. These engineers are groping for the plan which will make this rushing stream generate sufficient power to lift itself to the top of its high banks and to do this at an expense so small that there will be profit in the accomplishment. They expect this will eventually be done.

That other great flood of the West, the Colorado, is but slightly used for irrigation. The Reclamation Service has turned a small amount of it into the desert, and gardens of tropical productiveness have resulted. But there is yet a waste in Southern California as large as the State of New York which might be likewise served. These wonder-workers

expect in time to bring about a condition under which every particle of the water of this great river will be thus set to the growing of oranges, and dates, and grape-fruit, and pine-apples, and those other fruits that are of a region a bit warmer than any of the rest of the United States and upon the growing of which this region has a practical monopoly.

CHAPTER VI

SHACKLING THE MISSISSIPPI

AFTER a thirty-year fight the government's army engineers find themselves in the very midst of their attempt to tame the mad waters of that greatest of streams, the Mississippi. From the point where its headwaters reach into the valleys of New York, to the crystal lakes on the Canadian border and again to the top of the continental divide in the Rockies, the waters of the Mississippi have been followed into the funnel that takes them to the sea below New Orleans. There is a million and a quarter square miles in the area of the fan of the great stream thus spread out. Upon it might be unrolled five German empires. Within its borders lies 41 per cent. of all the land of continental United States. Every drop of rain that falls in all that vast expanse, the snows of its winters, the gush of the crystal springs, must find their way between the levees of its lower reaches. Uncle Sam is trying to control this vast flood.

Through the ages the stream has run rampant. Its torrents have torn down from its widecast mountains, have ripped through its prairies where they would, have flooded the 60,000 square miles of its lower valley at will and wandered into the sea

through all manner of outlet. The mad power of all this water has known no force that dared grapple with it until the pale-face came from across the sea, settled in the empire that it drained, and found that these erratic ways interfered with the conduct of his business.

This frail man-creature stepped forth and issued his orders to the great stream. He commanded that it should so deport itself at its mouth as to cut a channel that should be always thirty-five feet deep instead of nine, that his ships might pass in safety to the cities beyond. He ordered that it should stick to one narrow channel instead of cavorting about the country, for he had need of these overflow lands as well as of the stable stream. He wove great mile-long aprons for the river banks with trees for yarn that they might not be cut into by the changeful stream. He put forth his dams that checked the low-water flow of the upper rivers and doubled their depth. His fleet of dredges gave deepness to stream stretches where sandbars insisted on casting themselves up. From the gulf to the headwaters various orders have gone forth and the mighty stream and its 13,000 miles of tributaries are being disciplined into obedience.

This great task is being performed by the army engineers—those same men who have just completed the Panama Canal in record time, who have given New York harbor her channel to the sea 2,000 feet wide, have penetrated the Philippine

jungles with highways, have built a Gibraltar at Honolulu, constructed Washington Monument, and jettied the entrances to a score of great harbors.

The peculiar position occupied by the engineers of the army is not fully appreciated. In the first place, this is the oldest organization of engineers in America. The military school at West Point was established in 1800 that engineers might be trained and was the first school of engineering in America and practically had the field to itself for half a century thereafter. So was placed in the hands of the army practically all the important work of this sort in the early days of development.

The army engineers came into being largely for the purpose of building fortifications, but recently this has become the less important part of their work. Wherever there develops a great task the government has come to ask the advice of these engineers and, almost universally, to turn it over to them.

West Point is primarily an engineering school. The discipline of it, its insistence upon the maintenance of manhood standards, and the public service idea that underlies it, make a strong foundation for the building up of an unusual corps of workers. The engineers are selected men who are graduated at the head of their classes. These honor men are then put through a period of ten years at practical work which gives them opportunity for special development and for the elimination of the less fit. For ten years more they are assigned

to the big works but with a score of checks upon their performances and a prompt reminder of any shortcoming. To the very end of their careers every piece of work they do must pass a division engineer, the chief of engineers and a special board of review. The requirements are for flawless work and a lifetime is devoted to making this sort of work possible.

Congress has acquired the habit of asking a report from these engineers on all work for which appropriations are asked. The skill of this great organization with the highly developed individuals, with the elaborate systems of checks, with its removal from all outside influence, has come to make its reports regarded as the very last word upon the given project. It is said of the army engineers that there is no court in the world that delivers a verdict with the same elaborate and skilful weighing of evidence that it applies.

The early French settlers had to portage their goods from Lake Ponchartrain to the Mississippi when they traveled from the settlement at Boloxi, on the coast, to Point Coupee, on the great river. After dragging their boats across this neck of land they camped on the banks of the Mississippi. A little village eventually grew there and its location was found favorable as trade grew. It came to be known as New Orleans, and grew to be the southern port of a great nation. It developed that by accident the location had been at a deep place in the river, else the city would never have been.

The first levee that was ever built on the Mississippi was a narrow ridge thrown up around this settlement to keep back the floods. From that beginning there has grown a system of 1,500 miles of great levees from Memphis to the sea that is the most extensive work of its kind in all the world.

This levee protection grew sporadically and under various influences. Individual landowners sought to protect their holdings, districts banded together for the same purpose, states took up the work more extensively and, finally, the government realized that this was a national affair and leant a hand. At present, there is cooperation between the nation and the states and the work of the lower stream is carried on under a commission.

The levees, having thus grown haphazard, are not uniform nor built always as they should be. The breastworks of defense against the floods are, however, thrown up from Memphis to the sea and are of the same general character.

The typical Mississippi levee is fifteen feet high, 150 feet wide at the bottom and eight feet across the top. They are made of ordinary earth and a sod of Bermuda grass is planted over them to prevent their erosion. At some places the height is as much as twenty-five feet and the width in proportion. There are places in this great river where the water is sixty-five feet higher at some times than at others and a difference of fifty feet between high and low water is almost general. It is difficult to appreciate

the amount of water that passes Vicksburg when the floods pile sixty-five feet on top of what is already a great river and bear that current, miles wide, on to the sea.

Under the army engineers, this levee is being standardized, and eventually it will be developed to a degree of stability where it can be pretty well depended on to carry these floods on to the sea while the fertile fields of cotton and cane repose in safety at a level twenty feet below the surface of the water of the river. Already $60,000,000 has been spent upon this 1,500 miles of levee and the great stream is nearing control in these lower reaches.

Every year the Mississippi brings down to the Gulf enough sediment to cover thirty square miles to a depth of one foot or one square mile to the depth of thirty feet. When the moving water of the river strikes the still water of the Gulf, all this suspended matter is deposited. The muddy water spreads out when it reaches the Gulf and so deposits a bar beyond its mouth over which there is normally but nine feet of water with a tendency to fill in behind this bar. All the land below Memphis has been built by the pushing forward of this bar through the ages. This bar would effectually shut out the big ships of the world and none of them could get into the great river if something were not done.

The Mississippi spreads out at its mouth and flows through several channels with portions of its new-made land between. The first idea was that

one of these passes should be selected and kept dredged to a certain depth. But it was found that the silt deposited so rapidly that there would be no permanence to such work, and another way out was sought.

It was back in the seventies when an engineer named Eads proposed an alternative. He held that if jetties were built which narrowed the stream, it would be forced to cut its channel to the required depth and that it would give the muddy water such an impetus that it would carry the silt far out into the Gulf before it slowed down to the point where it would drop it.

The government gave Eads a contract upon which he was ultimately to receive $10,000,000 and he built the first jetties and these were to a certain extent successful and gave a depth of twenty-six feet to the Gulf. Thus was the river opened to big ships.

This was called the South Pass and through it commerce has been passing for thirty years. But in the end the ships of the nations grew so large that the depth of this pass was not sufficient to accommodate them. The force of the water that went through the South Pass was not sufficient to scour a bigger channel; so another of the outlets was selected, the Southwest Pass, and government engineers began trying for a depth of thirty-five feet and have spent, since 1902, $8,000,000 in the attempt. To-day, the current is cleaning its own

channel thirty-five feet deep and will continue to do so until the depositing silt has filled up a great hole in the Gulf and built a bar in its place. It has been a ten-year fight to get the channel and the battle must go on constantly to the end of time for its maintenance.

Throughout the length of the Mississippi and the Missouri there is found the constant tendency on the part of these erratic streams to cut into the banks and whatever levees may be thrown up, to undermine them and cause them to tumble into the stream. Many levee breaks have been thus caused and even high banks upon which have stood villages have been tumbled into the river.

The army engineers studied methods of preventing this cutting for many years. Eventually, they settled upon the woven treecloth mattresses as offering the greatest amount of protection and for a decade they have been manufacturing these clothes for the river bank and these banks have been wearing them summer and winter.

The job of weaving that is here carried on is stupendous. The warp and woof that go into the making of these mattresses are willow trees. Tops and branches of the trees as large as four inches in diameter are gathered together in great barge-loads. A pattern is started with steel cables as a basis and into this is woven the willows. The pattern may be as wide as 250 feet. In a single piece it may extend a thousand feet downstream

and cover ten acres of land. The principle of its weaving is the same as that which produces gossamer silk, but the product is far different.

When one piece is finished, it is anchored in the place where protection is desired and stone is put on to weight it down and hold it in its place. The barges are moved a bit upstream and another section is begun which will overlap a little upon the piece below. In this way, the banks of the stream for miles where cutting is threatened may be lined and the water be kept back from the soft dirt that might be washed away.

The mattress lies beneath the water, and, not being exposed to the air, lasts almost indefinitely. The part of the bank that is above water at times is revetted with stone to prevent cutting. So is a current-proof bank provided and so have great stretches on both the Mississippi and the Missouri been made stable.

On the Ohio there is an entirely different task upon which Uncle Sam is spending $65,000,000. There he is putting a series of fifty-four dams that he may control the stream flow in such a way as to give a depth of nine feet of water for river traffic at all seasons of the year.

It is almost a thousand miles from Pittsburg to the Mississippi and the coal barges that float down the Ohio are innumerable. There are seasons of the year when the water is so shallow that it may not be used for this sort of traffic and the fleets are

loaded and moored in the vicinity of Pittsburg, and wait for the coming of high water. At one time it was calculated that 1,200,000 tons of coal waited at Pittsburg for higher water. The loss in holding the barges amounted to $3,000 a day and they waited five months before the necessary depth was secured.

Such conditions as these convinced Congress that it would be advisable so to improve the Ohio that vessels drawing nine feet of water might ply back and forth at all seasons of the year. This decision was reached in 1910 and since that time the federal government has turned over each year to its army engineers $5,000,000 to be spent on this stream.

And the plan for bringing about the desired result is most novel. Fifty-four dams are to be thrown across the river. These are not, however, dams that bar the river under normal conditions. As long as the stream measures nine feet deep the dams lie flat upon the bottom. When the stream gets low and the depths become shallow, they rise up and check the passing water until it creates the desired depth. Likewise does each dam fill a lock by its side, thus providing for the letting down or the lifting up of boats and barges.

These are known as needle dams. They are made of sections two feet wide and ten to eighteen feet long. These sections lie flat on the bottom of the river until needed. Then they are raised into a vertical position one at a time. A prop drops into

place and they are held in this position. The course of the river is effectually blocked. A lake is formed above them that has a sufficient depth for navigation. The fifty-four of these dams will fill in the shallow reaches and maintain the nine-foot depth throughout the length of the stream from Pittsburg to Cairo.

The federal government, through its army engineers, is spending $20,000,000 more on the Missouri River between Kansas City and St. Louis. This project was given the sanction of Congress in 1912 and about $4,000,000 a year has been provided for it.

Here, however, the problem is entirely different from that on the Ohio. There are no locks nor dams. The depth of flow to be maintained is six feet instead of nine. The difficulty is in preventing the river from eating away its banks, carrying them down the stream and converting them into shoals and sand-bars.

The first step is to maintain banks, for it is with the cavings of these that the river channel is constantly filled up. The stream is to be prevented from eating into its banks. To accomplish this the banks are to be protected in many places with mattresses and revetment. In other places spurs and dykes are to be thrown out into the stream to control its course and keep it in a channel that does not change.

On the Mississippi from St. Louis to St. Paul, the

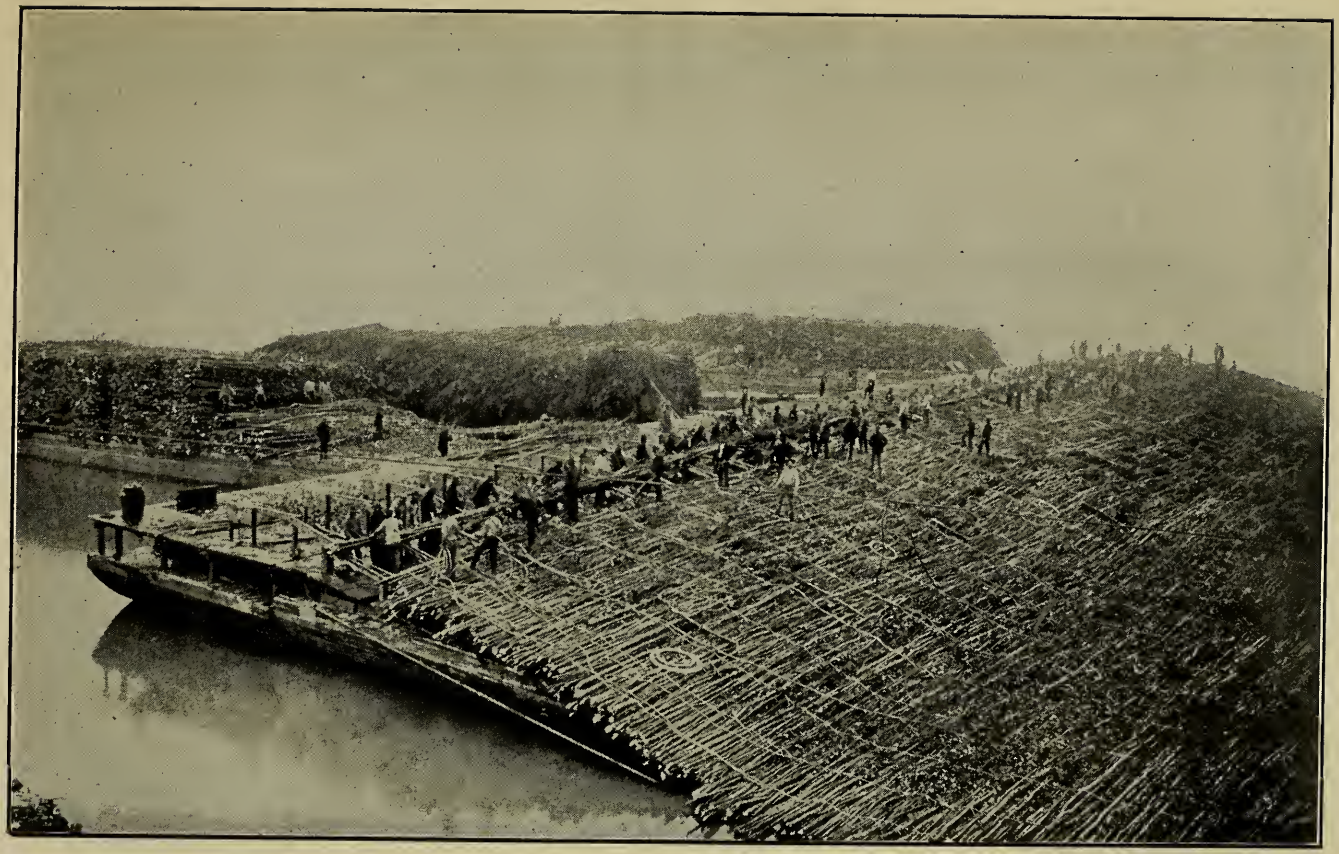
government is spending each year $1,500,000 in its attempt to establish and maintain a depth of six feet. It has been working on this upper stream for many years and this depth is pretty well established. It is accomplished by the use of dykes that keep the stream narrowed and in place, by an occasional dam where needed, and by a bit of dredging here and there.

There are three great storage reservoirs near the headwaters of the Mississippi that were built so long ago as to have been almost forgotten. There are three principal lakes that furnish water to this river near its origin. Across the mouth of each of these was thrown a dam some thirty years ago. These dams raise the water twelve feet in the lakes and allow great amounts of it to accumulate in the wet season. Then, when the time of low water comes, the flood-gates are opened and the stored water is let out. The result is a depth of fourteen inches at St. Paul above what the flow would be if the reservoirs were not in operation.

From St. Louis to Cairo the government spends each year a million dollars in an attempt to maintain a depth of eight feet for navigation. The river has been pretty well established in a channel of that depth. It requires, however, a good deal of dredging that must be constantly done all along the stream at places where the current may not or has not yet been made to cut its own channel. At all the stations from St. Paul and Kansas City to the

jetties at the mouth of the stream the dredges work constantly through the low-water season.

So it appears that the control of the stream flow of this great river basin, taken in all aspects, is no mean task. It is the government's most expensive task next to that of building the Panama Canal. It is a job partly prompted by the needs of commerce but partly by the desire of a benevolent government to make life safe along the great stream that many men and women may dwell there in prosperity and happiness. It is a task that will remain with this generation and be bequeathed to the next but the details of which have been pretty well mastered.



WEAVING THE TREE CLOTH

PORTO RICO NATIVE TAKING PIGS TO MARKET

CHAPTER VII

HELPING THE FARMER'S WIFE

THE federal government through it svarious departments has surveyed the field and come to the conclusion that things are amiss in the rural home. I have talked long with the wise men in the government service and draw the following picture largely from the information they furnish.

Were the six millions of farmers' wives in the United States placed in a caldron, fused into one homogeneous mass, enough of it chopped out to make one woman—the typical farm woman—and were she depicted to the people as she is, there would be the greatest tragedy of American civilization; and so commonplace is this tragedy, so often recurring, so long portrayed, that the senses of the people are dulled to it. The masses do not realize its presence, and the very star performers in it are unaware of the parts they play. The cause of it all —the farmer himself—does not know the thing that is going on in his very household. So subtly and gradually has it borne down upon the victim that neither she nor any of the other members of her family have realized her crushing.

But this typical farm woman! Let us take a look at her as though she were a creature seen for the first time and, therefore, seen with the vividness of a first impression. As representative of a hardware dealer in the adjacent town we have called on her husband. It is spring and soon the rattle of the mowing-machine is to be heard in the land. The fields are just beginning to show the tassel of the barley, and the oats coming to head, and the farmer needs a new machine and we are here to sell it to him. Hale and hearty and prosperous, he asks us to dinner and we accept the invitation.

We see the farmer's wife for the first time. It is but a fleeting glance as she passes an open doorway, while we wait in the bare sitting-room. We catch the dark hair combed straight back and knotted, then the blue calico dress falling unbroken in one piece and tied about with a checked apron. Such a slim and gaunt figure, we think. We look at her more closely when we come to table. This farmer is thirty-five years of age, and, knowing the manner of rural marriages, the wife must be two years younger. Yet she looks a woman past the prime of life, and broken. Her thinness is appalling. Not an ounce of flesh shows on her stooped and wiry frame. There are no signs of the feminine tendencies to adorn the person, nor is there a vestige left of the softer qualities that go to make up the appeal of woman to man. There is the one characteristic, that of activity, for she is intensely busy. Yes, and

one other—a look of hunger in the eyes and a hanging on the words of the stranger when he talks of the things of the outside, the things of which she has so little opportunity to know.

Yet we are aware that this woman is not an individual, but a type. We have seen her in the railway trains where two seats were turned together and many children sucked striped sticks of candy. We have seen her with the same children about the counter in the country grocery. Swarms of her lend a somber element to the gay throngs that turn out in rural communities on circus day. Come to think of it, our mothers looked like this when we first remember them in the boyhood days when we were so happy and carefree back on the farm. How thin she has always been!

There is a lot to be found out about this woman, and it is vital to know of her. It is she who bears the brunt of feeding the multitude for which the farmer receives so much praise. It is she who gives birth, before her vitality is sapped, to the men who make history. It is she who is martyred even in the times of peace and plenty. It is a useless martyrdom, for it is easily preventable, and for this reason it is especially important that her condition and the causes of it should be known.

In the first place, you will be told that it is all bosh about the unfavorable conditions on the farm; that the farmers last year raised seven billions of dollars' worth of produce and that they have given

themselves the uplift. Conditions are not at all like they used to be on the farm, you are told, for these men are now riding in automobiles, and running water has been put in the house. You visited a farm in Iowa last summer and found these things to exist.

There is a lot of truth in some of your statements, for the farmers have made a great deal of money, and in some communities there are hundreds of conveniently arranged and ideal homes on the farms. We are glad you mentioned these ideal homes and that there are so many of them, for they prove the possibilities of farm life. They should be provided for all the farms, and they may be provided, but they are not. The consensus of opinion of the greatest authorities in this country upon farm conditions is to the effect that probably 10 per cent. of the farmers are grasping their opportunities for better living in so far as the home is concerned, and that the condition of but 10 per cent. of the women is improved. Strange to say, with the vast majority there has come a worse condition with the development of the farm and the advent of prosperity. The Country Life Commission, some years ago appointed by the President, traveled the country over and found this to be a fact. The practical men of the Department of Agriculture state the condition as a fact. We who grew up on the farm, but have since gained another viewpoint, see its tragedies and are not misled by the stories

of the automobile farmers which are giving the general public the idea that Sherrys and Martins are losing their chefs to these rural autocrats.

The tale of the way the wife got the worst of it is the simple tale of the development of the farm. A young farmer and his wife, for example, went West twenty years ago to carve out for themselves a future in a new land, or moved on to a new farm adjoining those on which they grew up. They were young and strong and courageous and laughed in the face of the difficulties they met. They staked out their farm in the forest primeval and felled the trees and built themselves a cabin. The man labored in the clearing all day and the wife sang merrily about the house. Her inside duties were, however, simple and easy, and she found plenty of time to make a garden, care for the chickens, and often lend a hand in the work of the field. Her task was lighter than her husband's in the fight against the pioneer conditions.

The husband worked persistently and the clearing grew. As the years passed, the crops covered a greater and greater acreage, and the harvests brought more money. A larger house was built and its care required more labor. A hired man was necessary in caring for the farm, and his meals must be cooked. The old cow had developed into a herd of eight or ten, and there was milk and butter in abundance to care for. At the end of seven years three children had come into the

family, and the mother must attend to their many calls upon her time and strength. Things were growing complicated for her.

Yet for the husband there was but the necessity for a man's work each day, for, with the advent of prosperity, he had added to his working force. His was the business of getting money out of the farm, and these hired hands were profitable. Hers was the business of keeping the house in order, and the additional burdens had come so gradually that there was no realization of their increase. Anyway there was no hired help to be had, for there were no women to hire. Of course, it was not man's work, and the farmer, like the warrior of old, draws the line very closely in these matters.

The conditions under which the division of labor in this family developed are almost universal. They would vary slightly on a New York dairy farm or on the prairies of Kansas or in the wheatfields of California. Yet they are the conditions of the average prosperous farm home. The woman's lot is better where there is less prosperity, and is quite simple where there is poverty. But the increase in the production of the farm, in its size, in its wealth, all tend to make the burdens heavier on the woman. This matter of work—toilsome, tedious, monotonous, never-ending work—is the down-crushing burden of the woman on the farm.

Setting down the program of the woman's day at

her duties may show her task more graphically than anything else. Here it is:

From 4 to 6 A. M.—Breakfast for the men and getting them off to work.
From 6 to 8 A. M.—Washing dishes and milk-buckets and putting away the milk.
From 8 to 9 A. M.—Getting children off to school, churning, working the butter.
From 9 to 10 A. M.—Getting in vegetables, dressing poultry and odd jobs.
From 10 to 12 A. M.—Getting a boiled dinner for the family and hired men.
From 12 to 1 P. M.—Serving dinner and cleaning up.
From 1 to 3 P. M.—Sweeping, cleaning house and making beds.
From 3 to 4 P. M.—Ironing, scrubbing and odd jobs.
From 4 to 5 P. M.—Gathering eggs, care of poultry.
From 5 to 6 P. M.—Getting supper for family and hired men.
From 6 to 7 P. M.—Serving supper and cleaning up.
From 7 to 8 P. M.—Straining milk, washing utensils, preparing for breakfast.
From 9 to 10 P. M.—Mending clothes for children and men folks.

This practically completes the woman's eighteen-hour day, when there are no extras. Interspersed with the other tasks are those of taking care of two or four small children. There is often extra work, as the washing must be got in some place, the clothes of the children made, fruit in season put up, an extra lunch for the men in the harvest-time prepared, and countless other such possibilities. The baby may break the mother's rest in the brief

respite of sleep. There is often illness in the family, and the burden falls on her. The illnesses peculiar to women sap her strength, and the bearing of children undermines it.

Yet the husband, with his man's strength and none of these drains upon it, does not realize that she is doing more than her share.

Her tasks must be performed 365 days in the year. The family and the hired men must be fed on Sunday and holidays. There is no variety in the work, as there is with that of the men outside, with the change of seasons. It is the same endless monotony, the same tasks to be done in the same way. Even the boasted health opportunity of the country is denied her. There is no running water in the house and no sanitation. The refuse decays on or near the premises, and the wife lives always among its odors.

Another of the current mistakes about farm life is the belief that it is far healthier than that in the cities. It is healthy only in proportion to the number of hours that are spent in the fields away from the house. The farmhouse is a breeder of disease. Dr. Stiles, of the Public Health and Marine Hospital Service, has just made an exhaustive study of rural conditions in the South and reports that there are 5,000,000 farm people in that section who are physical wrecks from disease caused by a lack of sanitation.

As a general rule, there are no women who can be

employed for work in farmhouses. Who ever heard of a farmer who would pay a girl more than three dollars a week? His mind is made up to the effect that she is worth no more, and he will pay no more. Who ever knew of a girl who would put up with the monotony and isolation and long hours of farm work for three dollars a week when she could get six dollars for the asking in town, for less work, where she may have abundance of opportunity for association with her kind?

Then there is a sentiment back of it which the women themselves hold and which militates against them. Their mothers ahead of them have handled the tasks of the home, and they are sacred to the wife. She feels that they are hers alone and rather resents the presence of a hired woman in the house. The farmer girls who hire out are young and strong and buxom, while the wife is thin and worn and unattractive. An instinct forbids the presence of the other woman in the house.

In addition to these naturally accumulating hardships on the farm woman, there are peculiar characteristics of the farmer himself that greatly accentuate them. As has already been seen, he is averse to turning his hand to anything in the house. In the pioneer days the line was closely drawn between man's and woman's labor. Farther back than that there was the division of the work into that which was a woman's, and not befitting a man to set his hand to. The American Indian will not

touch squaw's work. It is a savage idea and a survival of savagery. It does not hold in a scale of living that is a little ahead of the home life of the farmer. The clerk in a store will sweep the flat for his wife and dry the dishes after supper, that they may have an hour together. So will the office or professional man who sees his wife overburdened. These men spend the holidays and Sundays fixing up conveniences about the house. But not the farmer. It would be unbecoming to the dignity of his manhood! There are exceptions, of course; but the rule holds with the great majority, and exists as a simple fact. The same general condition holds with the hired men, yet I have seen one of these who could feel the great weariness of the farmer's wife and who would perform tasks to relieve her. The gratitude she showed this man was pathetic.

But the greatest of the shortcomings of the farmer lies in the fact that he provides his wife with nothing to make her house more homelike or to lighten her labor. It is fruitless to deny the fact that no thought is taken of the improvement of the farm house. When the farmer and his wife started in with nothing in the early days the all-absorbing thought was the getting of money out of the farm. To do this was the dominating idea ever in the man's mind. There were few conveniences in the house or in the field. The farmer found, however, that the net output of the farm would be increased by the purchase

of the best machinery. This machinery was installed, and paid for itself many times over. The policy was continued, and soon there were wagons and mowing-machines and gang-plows and thrashing-machines. The principle did not apply to the house. It was not obvious that the installation of a modern range would increase the output of the farm, nor would running water in the kitchen.

There were other reasons for the lack of these things. Life on the farm is isolated. The fathers of the farmers were farmers, and their mothers were farmers' wives. There were no conveniences in their homes nor in the homes of their neighbors. There is an unfamiliarity with their very existence that rather blocks their introduction.

The farmer has a greater number of virtues than any other man in the country, but he has his own peculiar faults. The tendency to extol him as the mainstay of the nation and possessor of all the virtues in the decalogue has somewhat spoiled him. The facts are that he has a few very glaring shortcomings. He is sensitive of criticism, and could readily be broken of them if there were a way to get at him. He should be reminded of his shortcomings in no uncertain terms. He should be slapped in the face with them, should be insulted and made mad about them. In this way he would finally be brought to realize them and to mend his ways. He does not now appreciate the fact that he is not doing the right thing by his women.

There are some hundreds of thousands of farmers in the United States to-day who are working their wives into their graves before their time. An investigator, for instance, went out from St. Louis into the regions of the dairy-farms. Sanitary regulations in this section enforce a high degree of cleanliness. The milkers wear white-duck suits. The burden of maintaining this cleanliness falls upon the women. This investigator traveled for fifteen miles along a road lined with dairy-farms, stopping at every house and talking with the people. In that distance he did not find a family in which there was not a stepmother. The conclusion he drew was that one generation of women had been worked to death.

There is murder being done here. It may be in the conditions, but the husbands are responsible for those conditions and are offering up their wives on the altar of avarice. They are ignorant of what they do, but there is no excuse for their ignorance. The horror of it is not confined to the dairy-farms, but goes on throughout the land.

If every farmer in the United States could be got by the ears and made to look his wife over with the same judgment and discretion as he does his horses and cows, there would be the greatest revolution in conditions that the country has ever known. When a horse loses flesh, goes off its feed, grows gaunt, hangs down its head and drags its feet, its case is immediately looked into. It receives the treatment

it requires, and usually goes into the back pasture where the grass is tall, and does no work until its strength and health are restored. When the farmer's wife shows the same symptoms nothing is done for her, and she continues her monotonous drudge of seventeen hours' work a day until she drops. Let every farmer compare the physical condition of his wife with that of the business man's wife of the same age, and, if she is not as strong and young as the latter, let him lay the blame at his own door.

There is a strange land-mania that possesses great numbers of farmers and is responsible for many of the hardships that they force upon their families. When the federal Country Life Commission, some years ago, went on a tour and listened to criticisms from all classes of people, from coast to coast, they heard first-hand stories of these tragedies.

So many, in fact, spoke of this all-consuming passion for more land on the part of the farmer that the Commission is almost convinced that it is a class characteristic. One Southern woman told simply the story of the price her husband had paid for his mania. They had started life well-to-do with a two-hundred-and-forty-acre farm. But the land-lust seized the husband when the first paying crop was harvested, and he acquired an adjoining twenty acres at a bargain. He had worked like a demon, lived frugally, refused to improve the home or educate the children. There was the striving for

greater crops and more land. The two girls and one son grew to maturity in the frenzy of this struggle. One of the girls finally ran away to escape it, and afterward wrote her father taunting him with the fact that he had driven her to a life of immorality. The second girl sickened and died from the unsanitary conditions of the home. The boy enlisted in the army to escape and has never since been heard of. The land-mad farmer died on the farm in the presence of his old and work-worn wife, who welcomed his death as the one pleasant happening in thirty years of married life.

The chief mechanic in one of James J. Hill's railroad shops in the Northwest told another story. This mechanic had been the son of a poor man who had come to Kansas in the early days. The father had filed upon his quarter-section of land and had improved it. His specialty was cattle-raising, and the herds ranged on government land adjoining that which he owned. The mechanic and his sister herded them.

One day the children found two stray yearlings on the range. These were poor and worn, and had been dropped from some passing great herd because they were no longer able to travel. They were naturally the property of the finders if they could be coaxed back to life. The children succeeded in getting them home and showed them with great pride to their father. In a sudden burst of generosity and much to the surprise of the children he

told them that since they had found the yearlings they might have them for their very own.

In the days and months that followed, the two strays were led to the best grazing and for three years were guarded with such care that they became the pride of the herd. When the time finally came to market the prime steers the children saw them loaded on the train for Chicago. In a week their father returned with the profits of his sales. They asked of the money he had got for the prize steers and when he was going to give it to them. He said it had all been a joke, and that there was no money for them.

Two childish hearts were broken by that joke. The next freight-train for the West carried the boy away. Later the girl succeeded in getting to Topeka, and by some happy chance got into a school there. So anxious was she to make up the time that she had lost that she overstudied, went into brain fever and died.

The Commission heard many of these stories of the shortcomings of the farmer with relation to his family and nearly always it heard the complaint of the drudgery, the monotony, and the isolation of the woman on the farm, and the claim that, as a class, she was not getting her share in the prosperity. There were great numbers of women who told of the conveniences of their farm homes and of the pleasure of them, but these always confessed that they were in the minority.

One high-class and competent woman of this group living in Illinois, told of the building up of the farm home and the great number of conveniences and of the pleasure in it. She had been a school teacher before she became a farmer's wife. One of the commissioners asked her how it happened that she had such a successful farm home and how she managed to get so much more in the way of conveniences than her sisters.

"I knew what was due me and stipulated these things to my husband before I married him," she said. "They were in the contract."

This hint may be of value to girls all over the country to whom men on the farm are proposing.

There is still one picture needed to complete the rounding out of the life-story of the farmer's wife. She should be seen on a holiday. This holiday is Saturday afternoon, when she goes to town with her husband. It has been a month since she has been away from the farm, and she hastens through the noonday meal with no little excitement. She is aware of the fact that she is not overattractive in her plain, home-made calico dress entirely devoid of feminine adornment, and the baby is fretful, and the three-year-old chafes in his starched waist, and the five-year-old is in danger of falling out of the back of the wagon, but she is off to town, and this is the one break in the monotony she ever knows.

The streets are crowded on Saturday, for the

neighbors have all come in. So is the general store at which they trade. She goes to this store first, accompanied by her husband. They examine the stock and make various and sundry purchases. The husband is somewhat impatient, for the street-corner is the club, and all the men of his kind are there and full of talk of the things that are mutually interesting to them. But of course he carries the purse, and must be present while the purchases are being made and must pay for them. His wife is hurried through and he is emancipated.

When he is gone she remains in the store, as there is no other place more fitting for her to go. Finally, she realizes that the clerks are somewhat annoyed by her presence, despite the fact that her husband is a well-to-do farmer and a good customer. She goes out and drags the children down the main street, but they are fretful and sticky with candy, and she decides to take them back to the wagon.

Here she is more at her ease, and here she spends the rest of the day. The horses are tied to a long rack and switch flies amid hundreds of their kind, pull the wagon back and forth until it clamps and runs into another wagon, or rub their bridles off in their restlessness. There is a lot to worry about even if the children do not fret and are safe from accident among the wagons. The husband should have been ready to start home by four o'clock, but it is approaching election time and he is interested

in "saving the country," but she sees no humor in the thought. She is fearful lest the old speckled hen will not get safely to roost with her new brood of chickens. But Farmer Brown comes by with a cheerful word, and she is interested in the finery of the Jones girls who are just unhitching their new buggy from the rack, and there is the deputy-sheriff dozing in the shade of the court-house, and the grocery-wagons are rattling by and everything goes merrily, and the wait is not so long, after all, for husband shows up at six-thirty and they are off for home.

The unpopularity of farm life has grown as the position of the farmer's wife has become more difficult.

The result of this making so hard the woman's lot on the farm is proving to be the ruin of that great, basic industry. Even where she knows nothing better, where none of her sisters or friends married into a different life, there is a deep, unending hatred for the career she leads. It fills her breast before her children are born, and it enters into the viewpoint of things that these children get from her from babyhood up. The rising generations are starting in by hating farm life, and the great effort is to get away from the farm. Those with any ability succeed in doing so, and only the inefficient are left to improve the native conditions.

And it could all be remedied. There are most satisfactory homes in every farming community

in the land where the wives lead lives of thrift and industry among conditions that are as favorable or more so than those of their sisters in the cities. A kitchen can be arranged as well in the country as in the city and can be furnished with as many labor-saving devices. Every owner or renter of real estate in the city pays for the installation of running water in the house because health regulations force him to it. Yet the well-to-do farmer, who is much more prosperous than the average city dweller, says he cannot afford it, and his wife draws the water from the well, his house is unsanitary, the children die of typhoid and a bath is unknown.

The Department of Agriculture is the chief federal agency engaged in the task of improving the condition of the woman on the farm. Through that Department Uncle Sam is attempting to gain a complete understanding of the necessities in the case and to follow the long road which will lead to a general reform.

In this campaign a knowledge of the exact facts is necessary. All manner of method has been used in getting these facts. One system was the writing of 50,000 letters to individual farm women. Another was to send individual observers into a given section and have the households examined as an efficiency expert would look into the detail of a business. The great task of rural organization has been taken up and a bureau established for its

study. This bureau is interested particularly in rural neighborhoods with relation to their community life.

Exhaustive studies have been made of very particular things, such as the arrangement of a farm kitchen, the installation of running water into the farm house, the nutritive values of farm foods, the proper canning of fruit on the farm. Upon these and many other definite subjects bulletins have been issued that show in detail just how these advances may be made. The facts are shown as to the saving in labor that may be brought about through the use of a fireless cooker. The plans for a community laundry operated by the waste steam from the creamery to which many farms send a wagon every day, are definitely laid down. Exhaustive information on subjects too numerous to enumerate is being compiled.

Getting this information to the farm house is more difficult than getting the information. Findings of the government experts are first issued in bulletin form. These bulletins are furnished without charge to any farmer in the nation who asks for them. Hundreds of thousands of lists of publications are sent out every month with invitations to order those in which the individual feels especial interest.

The purport of all these bulletins is prepared for use by all sorts of publications and furnished to them free of charge. So does it reach a very large per

cent. of the reading public. All such information is given to the farm demonstration agents scattered throughout the country and to the many county agents. These men are expert in getting the information home to the farmer. The state agricultural colleges and all the state machinery that radiates from them is active in the campaign to improve country life through getting this information home to the farmer. Eventually it finds its way to the rural agricultural school, to the home reading club, to whatever local organization exists.

Slowly this campaign of education is breaking the ties that bind the farm woman. Slowly the farmer is being awakened to his neglect of his wife. Slowly he is seeing that family health and efficiency are so increased by bringing the home up to the standard that he cannot afford to live as of old.

Already is the change so thoroughly brought about in some communities that a charge such as is made here will be met with indignant denial. The government knows full well that these accusations do not apply to all farm communities. But it has studied the farmer in all his haunts and has tabulated him. It knows him from coast to coast and from Canada to Mexico. The member of the individual farm community where such conditions do not exist may hold that the farmer is here done a great injustice, but he knows only local conditions. The government knows that the masses of men on the farms have not yet been reached. In its

endeavor to make the lives of all its citizens as happy as conditions will allow, it is taking particular notice of the woman on the farm, appreciating always that she is one of its very greatest assets.

CHAPTER VIII

REJUVENATING PORTO RICO

IN Porto Rico, where tragedy has stalked through centuries in a land of sunshine, where famine has been constantly abroad despite a wealth of productiveness that required but an invitation to the soil, where the shadow of the hand of tyranny has brought gloom to the descendants of a race planted here in the time of its world dominance, there has come a change.

The United States as foster parent of this much abused waif of the mid-Atlantic has devoted a decade and a half to the training of its people. Uncle Sam has waved his magic wand and there has been a transformation. Idle lands have developed into fertile fields. The markets of the United States have been opened wide to the produce of the little island garden and a commerce ten times as great as ever known before has resulted. The good surgeons of the American army have assailed the disease demon that was throttling the whole people and a rejuvenated race has resulted. The word has gone forth to the occupant of the lonely cabin on the hillside to raise his head and look the whole world in the face as a destiny-defying man of the West should, and the message is being heard.

These good things are coming to that portion of

the soil of the United States that contains the densest population of them all. Porto Rico, territory of Uncle Sam since 1898, has a population of 310 people to the square mile. With the single exception of small areas of the mill districts of New England there are no other American communities so densely populated. In the little island there are 1,120,000 people. It is more densely inhabited than is France with 188 people to the square mile, Germany with 280, or China with 266. Its population is about equal in density to that of Japan with 311 to the mile and a little less than that of England, Scotland, or Ireland with 346.

Thus more than a million people for whom the United States has assumed responsibility is huddled together on an island that is but 100 miles long and forty miles wide. In square miles the island is less than half the size of the State of Massachusetts. Yet its population is about equal to that of Alaska, Arizona, New Mexico, Nevada, Wyoming and the District of Columbia combined. It is fairly aswarm with human beings. Numerically it is of much greater weight than vast expanses of our native soil that are reckoned as of huge importance in making up a nation.

This population is different from that of the densely inhabited parts of continental United States in that it is distributed mostly throughout the country districts. Only one-fourth of the people live in the towns while three-fourths reside on the land

and depend upon agriculture for a livelihood—a condition that makes it more readily possible to turn all these people into producers of wealth.

Since these residents of the West Indies have become a part and parcel of the citizenship that goes to make up the composite American, it is interesting to take note of the strains of blood that flow in their veins. Those who were born under the flag ask what manner of man is this typical American-Porto-Rican.

Probably the current idea is that the old Carib blood that was native to the island still courses in the veins of the present residents. This is true to a very limited extent. It was Ponce de Leon who first brought a Spanish force to the island and conquered its native people. Leon led this invasion in 1508 and the island was made a Spanish colony before any settlement was ever planted in continental United States. This adventurer had been a sailor before the mast with Columbus and with the great discoverer had anchored in Porto Rican waters in 1493, when Europeans paid a second visit to the land of the West. It was in Porto Rico also that Ponce de Leon got his inspiration for his search for the Fountain of Youth which led to his discovery of Florida, and the settlement of St. Augustine, the first on the American mainland. So, with the acquisition does the Florida town give over the palm of being the oldest American settlement. It was from this island also

that Cortez and his command of adventurers set out to conquer Mexico and wrote the most romantic and dramatic chapter in the history of the New World.

At the time of this first occupation by the Spanish there were various reports of the number of inhabitants. The population was dense and estimates were given ranging from 100,000 to 600,000. The Spaniards were in search of gold and the natives had shown them nuggets. The Caribs were enslaved and driven to the search of the precious metal. Not much of it was found and vengeance for the disappointment was visited upon the natives. Here is a dark page in the history of Porto Rico which is not recorded. There is but the report of men who visited the land fifty years later, one of whom estimates the total population, including the Spaniards, at 60,000, and another who makes the statement that there were not a hundred Caribs left on the islands. Pretty certain it is that the Spaniards came near exterminating the native race during that first five decades and that there is not much Carib blood in the present inhabitants. It is probably as well that the detail of that fifty years is not written.

The first settlers of Porto Rico were adventurers seeking wealth. Soon the fleets of Spain became most frequent in their voyages to the West. All of these made their first stop in the New World at Porto Rico. Always there were hordes of stow-

aways hoping for wealth and these were put ashore on the island. From the fleet there were great numbers of deserters. Criminals sentenced to the Porto Rican galleys ended their lives there and their blood entered into the whole. The strong military garrison that was kept in the island for centuries contributed its part to the people. Blue-blooded Spanish grandees settled there on large estates. The sons of Spanish office-holders remained there and reared families.

So it comes to pass that Porto Ricans of to-day are almost entirely of Spanish descent. The great mass of them are of that adventurous blood, the rabble of gold seekers and ne'er-do-wells, that cast their lots into the west. This blood is slightly diluted on the one side by that of the Spanish ruling class and on the other by the Carib. Aside from which there is one-third of the whole which is blood of the black from Africa, the descendants of whom live around the coast and devote themselves largely to the cultivation of cane.

But Uncle Sam found no swashbuckling adventurers cavorting about the island when he took possession of Porto Rico. The descendants of the early adventurers were found huddled on the hillsides, large families in single-roomed shacks which contained not a single stick of furniture. One or two cheap pieces of cloth hid their nakedness. They were a people without shoes, almost without food. Unsanitary living had undermined their physiques.

Centuries of oppression had broken their spirits. They saw visions of no condition that was different from that to which they had been born. A great inaction seemed to have settled down upon them. They were lost to the progress of the world.

Aside from the inaction that comes from a hopeless poverty and insufficient nourishment there was a great plague that perennially stalked about the land and palsied the inhabitants though they knew it not. This invisible specter with which even the scientists of the progressive nations were then unacquainted, poisoned the bodies of the men of the soil until their steps lagged, their energy was all gone, and they could but sit in the sun as the years passed and call down upon themselves condemnation for their apparent laziness.

But a young surgeon of the army, Major Bailey K. Ashford by name, discovered that the soil of the land harbored a microscopic creature that was a little later found throughout the Southern States of America and came to be known as the hookworm and which had been casting the same pall of inaction over the poor whites of that region. Since 1910, 190,000 sufferers of this disease have been treated and 60,000 have been pronounced cured.

These were the masses. Above them the governing class, a few thousand men who had stood for the régime of old Spain, had been made prosperous through office-holding or had gained much land through grants. These men had the Spanish view-

point in governmental affairs. This view, as demonstrated in scores of communities where the Spanish hand has been shown, is the exploitation of the masses for the benefit of the governing class. The welfare of the masses is not considered as against the enrichment of the few.

Even the ruling class in Porto Rico was comparatively without ambition. The individual who owned some thousands of acres of land and lived in one of the towns, was contented with two or three thousand dollars a year as an income. He did nothing toward the development of his estate beyond the yield of this amount. The thousands of men who might have been productive tenants were therefore deprived of this opportunity for creating wealth. There was the pall of an age-long stagnation that had settled down upon the land.

Yet the representatives of the United States government looked over the brand new possession and saw that the land was fair, that nature responded bounteously to but a little labor, that fortune awaited the cultivator of large areas, that all that might be grown could be taken by the cheapest sort of transportation to the best market in all the world, for the island was in the very front door of New York City.

It was found that the owners of a few plantations were making sugar with crude machinery. Even in 1901 there were but 70,000 tons produced. The production grew in a decade to 400,000 tons. The

output of cigars from Porto Rico at the end of a decade and a half was fourteen times as great as it was at the beginning. The mountains of Porto Rico have been found to produce such coffee as can be grown in but a few localities in the world, for high-grade coffee is produced only at elevations around 2,000 feet and its quality can not be equalled by the product of such great competitors as Brazil, where it grows in the lowlands. Orange, lemon, and grape-fruit orchards were planted and pineapple fields set to grow. All this sort of produce has been shipped into New York and brings top prices.

The United States realized that the first need of its newly acquired people was a bit of prosperity. It encouraged all the industries that promised immediate returns. The result is to-day that Porto Rico has five times as much produce on the market as it had in 1901 and that five times as much money is consequently going to the island to pay for that produce. Of this money, the individual Porto Rican is getting his share. Where wages were thirty-five cents a day in the beginning they are now a dollar. The result may be definitely shown by a statement of the fact that in a little more than a decade the natives were transformed from a barefoot people to a shoe-wearing people.

Hardly had he arrived in Porto Rico when Uncle Sam got busy on his one great specialty—education. With that old gentleman's penchant for governing all peoples for their own development rather than

for profit to himself, he began to look into the school question. He found that 80 per cent. of the people were illiterate. There were but 20,000 out of the 250,000 children of the island in school. There was but one building in all the land that was owned by the school system. The pupils were almost entirely without books and the teachers were largely pensioners.

In place of this to-day there are 1,180 school buildings scattered from one end of the island to the other. This means that there is one to every three square miles. There are 2,500 capable teachers who are inculcating English and industrial learning into these youngsters. There are 161,000 little natives attending. There are night schools to the number of 250 and more than 10,000 grown folks are taking advantage of them. The spirit of the thing has got hold of the people and the native legislature is steadily increasing appropriations for schools.

The American idea of advancing a people to a higher plane of living is to create a want within the breasts of that people. If it can be caused to want any given thing badly enough, it will find a way of acquiring that thing. So Uncle Sam figures that by educating these youngsters, he will create within them a desire for better living. He tries to plant always in their minds the advisability of the ownership of a bit of land, the benefits of work, the possibilities of farming, the need of participation in government. All these come with the attendance of

the American school and the next generation is expected to rise up and assert itself as did its adventurous ancestry but along the more wholesome lines of the Anglo-Saxon Republican.

The United States has had a difficult task in getting Porto Ricans to govern themselves in the light of the American idea. The Porto Rican of the upper class, when he speaks of popular government, means government by his class. He never considers the masses. They are chattels. It requires much repetition before he gets the idea of these men having a voice in government equal to his own.

On the other hand, the peon of Porto Rico, having always been a practical chattel of some landowner, can not grasp the idea that he is to have anything to do with the government. He has never had any voice, has never expected any. He is hard to awaken.

The administration of Porto Rico has been wrestling with these two difficulties. The American governors have been lecturing the upper class and educating the lower class. The assembly is elective and the people are allowed to vote. There has developed a new party which sees the vision and is grasping the idea of American government. There is still the old party that can see nothing but themselves as the dominating influence. Failing to see the new light this party is going down to defeat.

The government of the island is administered through the War Department and its Bureau of

Insular Affairs. The officials of importance are appointive and are named by the President. They consist of the Governor and the heads of the various departments who likewise sit as the upper legislative body. As rapidly as possible these posts will be given over to Porto Ricans, as these men have been found first-class executives when there is a superior to keep them on the track which American policy dictates.

It is the easiest sort of four days' journey by steamer from New York to Porto Rico, where the breezes are like April throughout the winter months and the fruit of the tropics may be plucked ripening from the trees. From New York, 1,400 miles south; from Florida, 400 miles east; it lies far out in the Atlantic, an emerald in the vast blue.

Regardless of what it may have to offer to the merchant, the planter, and the investor, two natural conditions—wonderful scenery and an incomparably delightful climate—furnish sufficient attractions to stimulate the most travel-sated tourists into experiencing a new zest in life. One of the pirate haunts of the olden days and the refuge of treasure-laden galleons fleeing from marauding English admirals who prowled the "Spanish main" centuries ago, Porto Rico has plenty to offer to those who seek the quaint and the picturesque.

To the traveler to whom the romance of four centuries past appeals, San Juan and other cities in Porto Rico are as alluring and far more satisfying

than were the prospects of adventure and unlimited wealth to Columbus and his followers, who did not find the gold they sought, but found a fair world for posterity.

When St. Augustine was first settled, in the city of San Juan, then known as the "City of Porto Rico," had been erected buildings and fortifications that are still standing. The first hundred years of San Juan's existence had passed before Jamestown came into being, and Hudson sailed up the river which bears his name. Its second century had commenced when the Dutch colonized New Amsterdam, and before the Pilgrims had disembarked from the Mayflower.

More than 1,500 miles of magnificent automobile roads make a visit to the island all the more alluring to the motorist, much of this having been constructed by the Spaniards, who, whatever their faults, build military roads that are the envy of the world.

There is an additional charm of a people foreign by nature, speaking a foreign language, yet ever smiling and courteous—a peaceful, happy, lovable people, the mingling with which brings the right feeling into the heart.

Benevolent Uncle Sam is going to work out a very happy future for these long-oppressed people and incidentally develop for himself one of the most productive little territories in the world. There are those who maintain that the removal of the duty from sugar will ruin Porto Rico. Those

who know the island best hold that its future should not rest with sugar and that in the end the less sugar grown the better. Yet there is sure to be many a plantation that will survive the tariff.

This island should be given almost exclusively to intensive farming. The climate is such that garden truck can be planted so it will come to market during any week of the year and should therefore be matured at the season when the States are not producing. Bundled aboard ship it can be quickly put into New York where the market is unlimited. The land of Porto Rico is intensely fertile and there are so many people to live by the soil that this method of farming which brings the largest return and gives employment to the greatest number should be followed.

And the people will welcome the opportunity for this sort of farming. They know nothing of it, but they are willing to work and are natural agriculturists. The Department of Agriculture has an experiment station in Porto Rico which is demonstrating many possibilities in the way of crops. Unfortunately, its directors are making the common mistake of scientific men and merely establishing technical facts without providing a way of getting these facts to the people who should be using them.

But a vast advance has been made already and the task of converting 1,120,000 tyranny-ridden descendants of the Spanish buccaneers into prosperous and productive Americans is well on its way.

CHAPTER IX

REMAKING THE "POOR WHITES"

IN the South, Aladdin is rubbing his lamp. Men are being made over. The great region between the Potomac and the Rio Grande is beginning again to bloom.

The federal government, ever watchful of the well-being of its citizens, found here 5,000,000 people against whom conditions had so conspired that they were the poorest of the poor, the most miserable of America's native born—a race unto themselves set apart. For a generation a way out for these men and women was sought until it has finally been found and the transformation is now on the way.

In the South there have always been plenty of people of varying degrees of prosperity, just as there are in other communities. People in the ordinary lines of business prosper and live lives not unlike people in New York, Indiana, or Nebraska.

On the great plantations there are people upon whom fortune smiles, men who till great areas with negro labor. Landowners of smaller estates farm them or rent them to tenants and are fairly prosperous. There is nothing in the condition of these to attract particular attention.

But living side by side with them is another class, a race unto itself, a mass of people poorer than the peasants of Europe or the natives of the Philippines. The "poor white," "the hill Billy," "the cracker," as he is variously known, has been produced by the peculiar conditions of the South.

Before the war these people had been poor, had owned no slaves, had been crowded from the productive lands, which were absorbed by the big estates, and had taken their places in the foothills and the mountains. They competed on poorer land and without machinery with the slave labor and cooperation of the great plantations and found it tragically unprofitable. The alternative was to hire out to the plantation owners and work side by side with the negroes in the field for a mere pittance, thus losing all social prestige.

The passing of slavery affected these people not in the least. They still hired out in competition with the negro or worked their small farms in a desultory way with ever decreasing returns, drawing supplies from the country store, for which the crop was pledged and promptly turned over at maturity.

For a hundred years the song of cotton-fields has been: "I'd rather be a nigger than a poor white man."

These people have done these same things so long that no other possibility occurs to them. A family of ten lives in a two-room house surrounded by a rail fence. The water for family consumption is brought

200 yards from a spring branch. There are no outbuildings, no barn, no cow, hogs, chickens, no garden. The family and its predecessors have lived here for a hundred years, and the refuse from the household has been deposited about the premises. The sanitary conditions are frightful.

Dr. Charles Waddell Stiles, of the Public Health and Marine Hospital Service, discovered the fact that practically all these people are affected by the hookworm disease, occasioned by this lack of sanitation, for the hookworm thrives in this polluted soil. Their blood shows a vitality as low as 30 per cent. of the normal and rarely more than 70 per cent. They are almost entirely without education.

The poor whites have crept west into Louisiana, Arkansas, and Texas, carrying their manner of life with them, thus increasing the magnitude of the problem. They are a dead weight about the necks of ten States, a responsibility that the national government had until recently sidestepped, a great black blot on the book of the nation.

Dr. S. A. Knapp was, a generation ago, instructor of agriculture in the Iowa State College, later its president, and still later manager of a large plantation in Louisiana. Dr. Knapp spent twenty years in the South, and in that time increased the value of the land under his care from nothing to $50 an acre. In 1904 Secretary Wilson of the Department of Agriculture, realizing the needs of the

South, called upon Dr. Knapp to wrestle with the great problem particularly with reference to the poor whites.

Dr. Knapp appreciated the task and its possibilities. He knew scientific farming and he knew the hearts of the poor whites. He saw the great vision of the way out and he knew the difficulties that beset it, for these people had no eyes for visions, were without hope, or ambition. They knew only their own squalor and would accept the word of no man that there was any other possibility.

A farmer asked Dr. Knapp one day if he believed in fertilizer. He replied, "Yes, half of it on the land and half on the man."

An agent of the German foreign office asked his advice as to how to improve the natives of the African colonies.

"What do they want most?" he asked.

"They are entirely satisfied. They want nothing," was the reply.

"Then develop a want," answered Dr. Knapp. "No matter what the want is, so there is one. Gewgaws are as good as anything else. A race or an individual without a desire can not be reached nor made anything of. When a want is aroused there is a chance to accomplish good. The important thing and the foundation of all development is to want something."

This creation of a desire was one of the great problems in dealing with the poor whites in the South.

They did not realize that there was anything within their reach worth while. They were beyond having a want.

One of them when asked why he did not try to get hold of some land for himself, replied:

"Paw always hired out, and so did grandpaw, so I reckon that's good enough for me."

There had been theorists ahead of Dr. Knapp who fancied the question might be solved in various ways. On St. Helena Island, off the coast of South Carolina, for instance, there is a settlement 5,000 strong where the school idea has been tried.

These people did not care much for the school and soon left.

So, after passing up many theories, Dr. Knapp settled upon the practical problem of creating in the hearts of these people a want. The thing that was vital to them was the discovery of the scientists that the lands upon which they lived contained the elements of plenty and prosperity and that they could get at these. They could not appreciate this when told. They could not realize it when shown. The fact was not personal to them.

These people were slaves to the credit system. Their per capita production was low. In Florida the average income of the worker on the farm was $119 a year as opposed to $755 in North Dakota. On St. Helena Island the average family did not see $30 a year. Everything eaten was bought from the store that "carried" the farmer while he made

his crop. The prices paid were excessive. The crop was eaten up before it was harvested. The methods of farming were so poor that there was apparently no possibility of bettering this condition.

The need was to get away from the credit system and to raise better crops.

To accomplish the first, it was necessary to produce what the family ate. This must be done without expense, for there was no money with which to buy. A garden, a few chickens and hogs are inexpensive and come near solving this problem. These are the things for which a want should be created, and to them should be added a small area better farmed than of old. Eventually the desires for a cow and horses should be added.

How was this desire to be created? How was the end to be accomplished?

This was the practical question that Dr. Knapp undertook to solve in thousands of communities and on hundreds of thousands of farms in the South.

You can't tell these people how to live differently, nor can you show them except in certain ways. If you or I went among them and lived as they should, the lesson would never go home. We are not one of them, and what we do they may not realize as possible for them. These people must themselves be guided in doing this thing, and this was no easy task.

"When an individual can not be persuaded to farm as he is advised," said Dr. Knapp, "he must be

induced to do so by some hook or crook. He himself must grow a garden about his house, raise chickens, feed some hogs, cultivate a crop under instructions. He must himself perform the miracle."

With the reaping of that first harvest under instructions, a harvest which is three times as great as any he has ever before grown, he becomes a changed man, for he knows what he can do. The burden of generations is lifted from him, and for the first time he knows the feeling of hope and of ambition. He has tasted of success and it is sweet to the tongue.

He has awakened and will shout the secret from the housetops. This one man becomes the demonstrator under the direction of the Department of Agriculture. He has been selected in the first place because of suspected latent possibilities. After the first year he follows instructions eagerly and works ceaselessly. His neighbors have seen his success and it has impressed them deeply, for he is in no way different from them.

The second year his fence bears a placard which announces that his is a demonstration farm of the government. He receives bulletins through the mail. He has been selected from among them all and is proud of himself.

Under the circumstances he feels that there should be no weeds in his fence corners, his horse

should have better harness, his house a coat of whitewash.

With the ripening of the second crop comes the local agent of the Department. The farmers of the neighborhood are called to meet at the demonstration farm and are schooled in the manner in which the remarkable crop was grown. They are told in detail just how to go and do likewise. They buy seed from the demonstration farm, and are advised by the local agent.

The following year, half of the farms in the neighborhood are producing these same increased crops, and usually in five years the whole community is at it.

There is infinite detail in arousing the farmers in a single district. Imagine, then, the task of arousing them in every district in the eleven great cotton-producing States. Yet this is being done.

The national government furnishes some $250,000 a year which is augmented by about $100,000 from the General Education Board, and this combined sum was being spent by Dr. Knapp before his death, in this work, and is now being spent by his successors. The amount is small to be spread over so great a territory, but local authorities and individuals often cooperate and bear a part of the expense.

Headquarters for this work is with the Department of Agriculture in Washington. There is an agent in each of the Southern States and under him

a few district agents. Then come the local agents, 400 of them in all.

This force has succeeded in establishing 60,000 demonstration farms such as that described. To these come the farmers round about, on an average of thirty, seeing each demonstration and learning its lessons. That takes the influence to 1,800,000 farms in a year.

The demonstrators are attempting to arouse a desire in the hearts of the farmers for good horses and good farm implements. In fact, the practice is to hitch up a good team and take it about the country.

Many farmers are allowed to drive it for a few furrows in their plowing. The advantage of the good team and the good plow is in this way shown and a desire for it on the part of the farmer is aroused. So with machinery.

Another matter that these demonstrations are furthering in the South is that of rural education. There are being established rural high schools, entirely removed from the town and those influences that tend to take the farm child away from the farm, and surrounded by demonstration gardens. In these schools are taught those things that fit farm boys and girls to live on the farm and make that life worth while.

Additional agricultural high schools and consolidated rural schools are making their appearance

here and there. This condition is typical of the tendency in the South.

It is planned to take the matter of demonstration to the home life of the farm as the idea develops.

In each community it is planned to build a simple house as a farmhouse should be built, and fit it with the conveniences which are within the reach of every farmer's wife. Then the countryside is to be invited to inspect it.

It is a great idea and it is working the miracle. Any man in the South who is not getting the benefit of the work may be placed in line for it by merely writing to the Department of Agriculture and stating his case. There may be a local agent and a demonstration farm near him.

Perhaps he may be needed to start a demonstration farm in his district. Every man in the South has Aladdin's lamp, and should learn the manner of its rubbing.

CHAPTER X

GETTING THE LAND TO THE PEOPLE

THE Land Office of the government is the greatest agency for the sale of real estate that has ever existed since the world began. It has sold, during the hundred years past, an amount of land which equals five-eighths of the area of continental United States, and comprises the most valuable stretch of farming land on earth. Another eighth it has appraised and retained for public purposes, such as national forests and Indian and military reservations. One-eighth is still public land and forms the stock in trade that the Land Office is to-day offering for sale. There is in it one single item of coal land appraised at $700,000,000. There are oil fields, gold mines, irrigated homesteads, towering mountains, burning deserts. It has disposed of or has for sale all that lies between the Atlantic and the Pacific except the lands of the thirteen original states and those of Texas.

Not all the government's land business, however, has been on the selling end. That vast area west of the Ohio belonged to the Indians originally and was got from them with their consent in some sort

of transaction. Under the scale of prices paid to the Indians the State of Kansas would be worth about two rifles while a rough territory like Wyoming would go for a mirror and a string of beads. All the territory was, however, bought.

When the government bought Louisiana it paid 3.6 cents an acre. The purchase price of Florida was 17 cents an acre, of the Gadsden purchase 34 cents, of Alaska 2 cents. That Uncle Sam was a good business man is shown by the fact that he immediately proceeded to sell those lands for $1.25 an acre, a price that seems wondrous cheap at this end of the century. Alaska, bought for $7,000,000 was thought a bad investment, but before half a century had passed it had produced $500,000,000 from mines, furs, and fisheries alone.

The first land ever sold by this government was auctioned off in Wall Street, New York, in 1787. It was at this time that a minimum of $1 an acre was established for all government lands and they were sold to the highest bidder for whatever they might bring above that amount. The first sale of a large tract took place about this time when 2,000,000 acres upon which Marietta, Ohio, now stands, was sold. A dollar an acre was the price to be paid. J. C. Symmes, a speculator of New Jersey, was one of the first purchasers of land from the government and bought that tract upon which the city of Cincinnati was afterward located.

For eighty years after the public domain was created it was regarded as a national asset and exploited for the sole purpose of acquiring revenue. During that period all the heart of the Mississippi Valley was sold and settled up. From the standpoint of sales the banner year in the history of the Land Office was 1836. In that year 20,000,000 acres were sold and $25,000,000 was the money received in return. Most of the lands sold in that year were in Michigan, Illinois, Indiana, Mississippi, and Alabama. The great panic of 1837 is attributed very largely to the monster speculation in public lands that had taken place in the year that preceded it.

The dullest year that Uncle Sam's real estate office has ever known was in 1862, the bad business being attributed to the fact that the Civil War was then being fought. It was at about this time that the policy of selling land for the simple purpose of getting revenue from it was changed and the present policy of using it as a means of providing homes for the people was substituted. Since that time the government has accepted from settlers a residence upon a tract of land for a period of years in lieu of cash payments. Uncle Sam has been more profligate in bestowing his lands upon his soldiers who have fought his battles than in any other way. The colonies had begun this policy before the Revolution and George Washington was the holder of many land warrants issued by the State of Virginia be-

cause of services he had rendered as a British Officer. After the Revolution these warrants were validated by the legislature of Virginia, and Washington was asked to select lands in Virginia's territory to the west. All that territory which is now Ohio and Kentucky was then a part of Virginia. When Virginia ceded those lands to the federal government, Uncle Sam assumed the responsibility for making good on the Washington warrants. Washington even went so far as to locate land in Ohio to which he supposed at the time of his death there was no question of his ownership. His titles did not appear in the Land Office records, however, and the land was afterward deeded to other individuals. The heirs of Washington to-day have a suit against the government because of his claim upon this Ohio land.

Of all her public domain the United States has bestowed one-seventh gratuitously upon the soldiers of her wars.

The most monstrous transactions in lands that this government has ever engaged in, however, have taken the form of grants to various railroads. Altogether it has bestowed upon railroads as an inducement to them to build lines into undeveloped parts of the country 190,000,000 acres. This is a region equal to Illinois, Indiana, Iowa, New York, Pennsylvania, and the whole of New England combined. It is an area vastly greater than the original thirteen colonies. Among the first land grants that

were ever made to railroads were those that gave the Illinois-Central certain alternate sections north and south, chiefly in Illinois and Mississippi.

The Northern Pacific received, in 1864, the largest single grant of land that was ever made by the federal government. This grant included every alternate section for twenty miles on each side of its lines in the states and forty miles on each side in the territories lying between its terminus on Lake Superior at one end and at Portland, Oregon, on the other. Altogether this railroad secured title to 45,000,000 acres of government land. This tract would be equal in area to New York, New Jersey, Vermont, Connecticut, and Massachusetts. The Southern Pacific secured similar grants in California; the Atlantic and Pacific through Arizona and New Mexico; the Union Pacific and the Denver and Pacific through Colorado and states adjacent, and other roads in various other quarters.

No act in the history of the Land Office has been so typically a proposition for the booming of real estate as were these grants to the railroads. Uncle Sam had these vast tracts of unsettled country which, without settlers, were valueless. With communication arranged these lands would have an always increasing value. The federal government figured in exactly the way that the owner of a suburban tract would figure in offering a street-car company certain percentages of his land if it would run tracks through that subdivision. The federal

government has unquestionably profited hugely by giving away to railroad companies lands that have since attained a value of unnumbered millions of dollars. The profits that the railroads have gained through an enhancement in these land values are almost beyond conception and the present values of lands they hold are shocking to contemplate.

For a century the nation regarded itself as being possessed of a thing in its lands of which it should make every effort to be rid. It had in the back of its mind the idea that the land should go to the man who wanted to establish a home on it, that it should remain with the individual settler. But it regarded its holdings so lightly that it took little pains that the matter should be properly worked out. There was land for all, and it was the government's glad function to distribute it and let those profit who could. There was no thought then of creating timber barons or cattle kings, or of coal monopoly. The sooner the land got into hands other than those of the government the better. And this generous donor was not so petty as to discriminate between kinds of lands, the uses to which they could be put, or the purposes which those might have who got them. To classify was a task too difficult or not worth while. The lands would classify themselves when they arrived in individual ownership. And so the door was opened for monopoly and for fraud.

If the government did not appreciate the invalu-

able nature of its assets there were men who did. Great fortunes were laid in the vast holdings of what had but a short time since been the property of the people. There was danger that the many still to pour into the West would by necessity become the servitors of a fortunate and early few. On this discovery indifference at once took flight. And so out of the abuse of the nation's generosity there came a reaction against a policy that was so liberal as to be dangerous.

The nation wanted home makers, but found its lands drifting into the hands of corporations who were withdrawing them from the market, awaiting a time when lands would be more scarce; it gave opportunity for many competing coal operators and iron manufacturers, but found the sources of raw material centering into a few large holdings; it wished its lands to be cleared of forests to make way for farms, but it found hundreds of consecutive miles reserved from use by the fiat of those who appreciated their worth, and many more miles of watershed despoiled of its needed covering in places where homes were not possible.

So there slowly evolved in the minds of the public a new policy. The nation awoke to the fact that the lands were getting away from the people. Yet they were public property. Why should a few individuals be allowed to take unto themselves this public asset? Why should an individual be allowed to file on a parcel of rich coal land under the guise

of taking unto himself a homestead, and sell his claim to the coal baron? Why should he be allowed to do the same with the unequaled timber lands of the Sierras? Why should an oil field be held as a placer claim? Why should railroads be allowed to patent mineral lands that were exempted in their grants?

It was in 1906 that the public awoke to the loss of its national domain. It asked the authorities at Washington what was left out of the empire with which it had started. The answer was that there remained in continental United States some 300,000,000 acres of land, an area equal to that region east of the Appalachian Mountains which has a population of 30,000,000 people. The public asked what sort of land remained. The government had not the slightest idea.

It was then that the nation's real estate office sought a way of finding out just what remained on its shelves. It called in the Geological Survey, a sister bureau in the Interior Department. It was found that the organic act creating the Geological Survey had stated that one of its duties should be to classify government lands. That provision had lain dormant but was here seized upon and under it a force of active men was placed in the field to take an inventory. This classification of the 300,000,000 acres of government land was one of the gigantic undertakings of the government during the decade that followed.

It required but little investigation to disclose the fact that the great mineral wealth of the land still left to the government lay in its coal. Theodore Roosevelt was then President and he immediately withdrew from settlement all government lands that were suspected of having coal values. His example was followed by Presidents Taft and Wilson until as much as 75,000,000 acres were withdrawn subject to classification.

When the geologists got into the fields to determine what lay beneath these lands that had been selling for a dollar and a quarter an acre, they revealed to Uncle Sam one of the greatest surprises that old gentleman has faced in all his career. They reported from Wyoming, for instance, considerable finds of coal lands upon which they placed a valuation of $500 an acre. There were great quantities of land worth from $100 to $200 an acre. A minimum of $20 an acre was placed on coal land within twenty miles of a railroad and $10 if more than twenty miles from such transportation. In Utah were found other great quantities of valuable coal that had not yet slipped from the hands of the government. Colorado contributed other fields; and valuable coal was found in Arizona, New Mexico, Montana, North Dakota, and other states. Altogether in the first six years of this work coal lands were found and classified with acreage prices definitely fixed that brought this known asset of the peope of the nation up to $730,000,000 or something

more than seven dollars for every man, woman and child in the nation. Yet the task was then estimated as being but about one-fifth completed.

These men of science are remarkably clever in drawing conclusions as to the coal that may lie under a given piece of land. They may take a great mesa twenty miles across upon which there is no single outcropping of coal. It may be but a sweep of barren desert. They will sink no shaft to determine what is underneath. But they may say that a hundred feet down there is a strata of coal of a certain grade and of a given thickness. Fifteen feet below this there is another layer of an entirely different quality and of another thickness. The land owner who has confidence in their judgment may sink a shaft and he will find the facts as represented.

These geologists got the facts upon which to base a theory a dozen miles away. At the end of the mesa a mountain stream had cut a canyon hundreds of feet deep. It had carved its way through the stratifications of the ages. On its way down it had severed two layers of coal. They might lie flat with the surface of the earth or there might be an incline. On the other side of the mesa, twenty miles away, there might be another cut that revealed the same seams of coal. This would show whether there was uniformity of thickness and of level. Upon the variations the scientists could base an estimate of the thickness of the coal and its depth at any point

on the mesa. Upon these facts also could they place a valuation on all the land on that mesa.

Such methods of determination of the presence and the value of coal are subject to infinite variations. The final valuation of the land in question considers all the elements of expense of mining and transportation. Even a most skilful test of the coal is made to determine just what is its heat unit when burned. The valuation is so placed that the government is assured that a private individual may work these claims at a profit whenever there is a demand for the coal.

In the meantime there was passed in 1910 a law which permitted the settlement of coal land as a homestead, the settler being assigned all surface rights but the privilege of mining the coal to be reserved and the farmer to be recompensed for any damage done his farm when that time should arrive. So is the government retaining its wealth of coal without stopping settlement of the land.

Out in the heart of California there are certain oil lands that have been yielding $10,000,000 a year and which are worth a cold billion dollars of anybody's money. All the world had been believing for a decade that these lands belonged to the Southern Pacific Railroad and to individuals to whom that railroad had sold them. That company and those individuals had been taking unto themselves the huge profits that came from those reservoirs of liquid fuel that Nature had stored beneath the desert

in the ages past. But when the government began classifying its land a different opinion developed.

That the United States still held a strong claim to the ownership of these lands was developed in an almost accidental way. The man who made the discovery was not a lawyer at all but a young geologist in the employ of the government. When he went to California to classify oil lands in a purely scientific study of oil resources, the magnitude of the value of lands which had passed into the possession of the Southern Pacific in connection with the land grants extended by the government at the time of its building, appalled him. He read the grants out of curiosity and found, to his surprise, that mineral lands were excepted from their provisions. The only mineral lands that might be patented to the railroad were those containing coal and iron. Aside from this only agricultural lands might be claimed by the company.

Now oil is scientifically and legally a mineral. Oil lands were, therefore, very clearly excepted. It was found, however, that title to these lands had been issued by the government. Those titles, however, noted the exception of mineral lands. They were therefore not titles if the lands in question were mineral. When the Southern Pacific transferred these lands it likewise noted the exceptions. Whoever received its deeds did so with a knowledge of the flaw in the title. So those titles

were not titles at all, it was claimed, and the land still belongs to the government.

This contention served the purpose of giving notice to all people who were seeking to illicitly obtain such lands that a new policy had been adopted. The government also took occasion to withdraw from settlement all lands suspected of containing oil, to have them examined by its classifiers and disposed of in accordance with their findings.

In California a million and a half acres of oil lands were withdrawn, in Utah 2,000,000 acres, and in various other states smaller amounts sufficient to make a grand total of 4,500,000 acres.

The classification work was already under way when, in 1912, the great phosphate scare seized the United States. It was asserted that Germany had a monopoly upon the phosphate of the world which was the basis of the manufacture of fertilizer. Germany even owned the important sources of phosphate supply in this country, it was asserted. It was because of the clamor that was raised in this connection that the classification experts in the field, most of them geologists, were instructed to search for phosphate. In two years they had found enough phosphate rock in the West to keep the factories of the world busy for a century. In fact they proved that the United States has by far the greatest wealth in phosphate known anywhere in the world.

When this phosphate land was found it was withdrawn from entry until arrangement could be made to prevent any possibility of monopoly in its disposition. There were in all about 4,000,000 acres of it, located chiefly in Idaho, Montana, Utah, and Wyoming, and it is being held against the time when it may be needed to make fertile the exhausted acres that produce the food of the multitude.

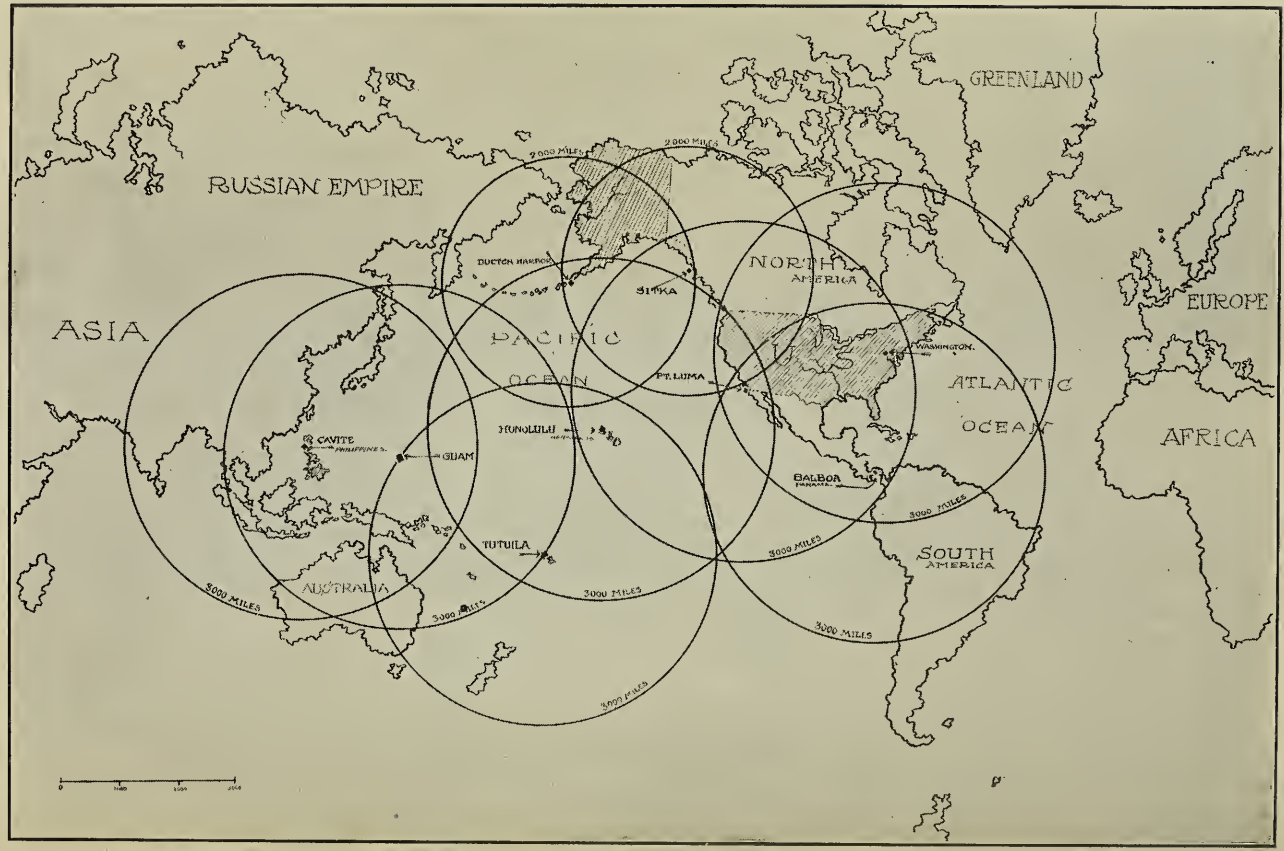
Quite a different sort of thing is the potash deposit. Potash may also be used in fertilizer and is much in demand in that connection. But instead of being found in the rock of high mountains, potash is secured in those dried-up lakes that are located in the torridly hot sands of such deserts as that of Southern California. In Searles Lake, in the Death Valley neighborhood, in the land of sand and snakes and thirst—a region that invites the adventurer because of the dangers that it has to offer—there are great quantities of potash. Here the occasional rains have washed down from the hills into these low places and formed shallow lakes without outlets. Through the centuries these lakes have received these waters and the sun has evaporated them, leaving behind their salt and borax and potash. This latter, being slow to precipitate, is found in a sort of mother liquor that still exists beneath a salty crust and this may be refined and the product secured.

Searles Lake had been fought over and parceled out between hardy characters of the desert before

the great demand for potash came. There remained other similar lakes that might furnish this product and title to which still rested with the government. Land in California and Nevada covering such potash deposits and to the extent of 225,000 acres has been withdrawn from settlement and held until the government might determine the proper method of disposition.

All of which is a part of the comparatively new policy of the government to get for the people the value of and the best indirect benefit from that which they still own in the public domain.

GENERAL LAND OFFICE, WASHINGTON



THE WIRELESS MAP OF THE NAVY DEPARTMENT

CHAPTER XI

SMOOTHING A NATION'S ROADS

UNCLE SAM found, early in the present century, that it cost, on the average, 23 cents to haul one ton one mile over his roads. He looked into the situation in Europe and found that the same ton might be hauled the same mile for 10 cents. He computed the difference in the cost of transporting the products of his farms at 23 cents and at 10 cents and found that he was paying each year a penalty of $250,000,000 for his bad roads.

So he began a serious study of how to improve those roads. He organized an Office of Public Roads in the Department of Agriculture and instructed it to find out what was the matter. Not only this but it was to get together all the information of the world on the subject of good roads, was to compile that information and place it at the call of the public.

So it happens that when there is a rural county in Mississippi, or in Michigan, or anywhere else under the flag, that has grown tired of the struggle against its gumbo roads or sand roads, or whatever sort of bad roads it may have, and wants to lay

down for itself highways that will have the effect of bringing the markets to the very front door of the farm, that county has but to ask and every detail of how to bring about the change will be supplied without the charge of one cent. The government has spent a score of years in preparing itself to serve its people in this very way, and is ready.

The information that has been thus prepared has been found to fit particularly well into the system of road building that is followed in America. Here the governmental organization that builds the great mass of the roads is the county. The control of the highways of a county are usually under a road supervisor, elected by the people, and poorly paid. He is usually a man of no special training, of little knowledge outside his home county, and of an uncertain tenure of office which does not make it worth his while to learn his business. It is rarely possible for a county to properly improve its roads under such guidance. Most counties continue under the handicap of unimproved roads, some raise large sums of money and spend them ineffectually, and a few, latterly, are coming to the federal government for information. These are patiently shown every step from the mud lane to the boulevard.

Only a great agency like the federal government could afford to spend many years and many hundreds of thousands of dollars in developing such information. Certainly a county could not. Years of experiment was necessary to determine what were

the best road-building materials and where they were to be found. Other years were necessary in demonstrating just how a road-bed should be graded and drained. Then the right method of laying down a road with the proper foundation, the proper filler, the proper crown, had to be studied. Different materials had to be used in different localities for the cost of transportation made long hauls over-expensive. Infinite pains were taken in the study of culverts and bridges, their proper placing and protection. After roads are constructed there is much of understanding that must be applied to their maintenance. Proper machinery for road building and maintenance is a great study in itself. The advisability of road construction on the part of any community depends upon a broad understanding of benefits to be derived. These may not merely be the material benefits of a cheaper haul, but the indirect possibilities of better schools, more social intercourse, the inspiration of a macadam road in contrast to the mud ruts.

In the first fifteen years of its existence the office of Public Roads spent more than a million dollars in the preparation of this information. It went into many counties in many states and constructed pieces of experimental road that the people of these communities might have the possibilities brought home to them and be shown just how the thing should be done. Good roads tours were organized and the gospel promulgated and models shown,

All the road information in the world was placed at the disposal of the individual who wanted to use it.

Some of the states have taken over the task of laying down the road system and these have been units great enough to be able to proceed independently with more or less success. But the road problem usually is a county problem and the federal government has taken particular pains in showing the county how to proceed to get the great boon. Usually the question is also that of a bond issue to raise the necessary money and here, again, is a delicate situation to be handled.

First the community must be brought to see the advisability of a bond issue, which means the assumption of a large loan that bears interest and increases taxes. The county, largely because of the difficulties in transporting its produce, already feels itself taxed as heavily as it can endure. The very isolation of its bad roads has prevented its residents from coming into contact with the other communities that might be object-lessons. A campaign of education is necessary. Carrying the election that provides for the bonds is the first big step.

The thing which is next in importance and with relation to which a community is most likely to go wrong is in securing a judicious expenditure of the money raised from the bonds. Here the difficulty lies in persuading the local authorities that they are

not competent to lay down a system of improved roads. No county should allow any man to direct the expenditure of the money for which it has bonded itself unless he has been engaged in the building of modern good roads for at least five years. In both these connections the right procedure is to consult the authority that has charge of the state highways and, finally, the Federal Office of Good Roads.

A primary folly in road-building is the fact that the average highway in the United States is sixty-six feet wide, whereas thirty feet is adequate. The extra space is not merely land wasted but it furnishes a breeding-place for weed seeds that cause trouble in all the crops round about.

A national demonstration of the effect of bad roads was shown in 1909 when the price of wheat in Chicago ranged from 99 cents to $1.60 a bushel. The price was lowest when the roads were best in the summer and reached the climax when they were almost impassable. Thus was a general case made out against bad roads. Roads that are good in all weathers enable the farmer to take advantage of favorable prices whenever they come.

The results attained in but a few counties through good roads are enlightening. In Mecklenburg County, North Carolina, 150 miles of road were built at a cost of $3,500 a mile. Land eight miles from Charlotte was worth from $10 to $25 an acre.

It was soon worth from $50 to $100 because with transportation easy, it yielded returns on those amounts. Jackson County, Tennessee, spent $250,000 on 150 miles of road and soon its lands were selling for four times the former prices. A macadam road was built to a farm near Gainesville, Georgia, which had been bought for $1,800. It immediately sold for $4,500. On the Williamsburg and Jamestown Highway farmers are now hauling 1,800 and 2,000 feet of lumber to market where they formerly hauled 600.

In 1893 Union County, New Jersey, against the protest of many farmers, spent $400,000 on macadam roads. The county soon became the envy of all its neighbors and they have all followed its example. Abington, Pennsylvania, had a taxable value of $3,000,000 in 1892 and bonded itself for $130,000 for good roads. It has doubled in population and trebled in taxable wealth. The State Road Association of Iowa says that dragging the roads enhances the value of adjacent property $10 an acre. Meigs County, Tennessee, refused to improve its roads; it lost 20 per cent. of its population and a corresponding amount in taxable values. It then decided in favor of good roads. The twenty-five counties in Alabama, Arkansas, California, Georgia, Nebraska, Mississippi, Missouri, Illinois, Indiana, Iowa, Maine, and Michigan that have lost population in the past decade have a percentage of improved roads of only 1.5. The

counties that have increased most in population in those states have a percentage of 40.

The road experts state that it is always advisable to provide a given system of roads all at once. The construction of a large mileage of improved roads at one time results in a lower cost per mile than if the roads were built a little at a time. Contractors having larger plants and quarries furnishing larger quantities of material can utilize these at less proportional expense than on small jobs. It is also true that a long stretch of road can be maintained at a lower rate per mile than a short stretch, for there is enough of it to warrant the employment of watchmen and repairers with the proper machinery. The long road meets the needs of traffic far better than a short one; it connects a larger number of people with a market or shipping point. Piecemeal building would result in isolated sections of good road, and these would be of little benefit; for a team can pull only the load that it can drag through the worst of the road. For this reason it is vital that the whole work of road improvement should be put through at a given time, and a large amount of money must be raised. In France a good draft horse draws 3,300 pounds to market a distance of eighteen miles any day in the year, rain or shine; and it will be remembered that France boasts the most productive and prosperous farming people in the world. Her roads are largely responsible for this.

All these things are part of an educational cam-

paign that will probably be necessary in securing the consent of the voters of any county to bond that county for $100,000 or for $500,000 for the building of good roads. When an affirmative vote is received there is temporary easy sailing. These county bonds are regarded as high-class security and sell readily in the market. They usually bear 4 or 5 per cent. interest and sell above par, at something like 105.

When all is ready the proper county official is authorized to advertise for bids on the bonds. This is usually done in a county, a state, and a financial paper, the last-named being located in some financial district. The bonds are taken by the best bidders and the money is ready. Generally only a fourth or a fifth of the bonds are sold at a time and in this way the interest on the whole is delayed. For a $400,000 issue $100,000 worth of bonds might be sold before the work is started and other similar blocks as the money is needed.

An issue of $400,000, which would be sufficient to put the roads of a good-sized county in shape, would require the payment of $20,000 a year in interest. If they were to be retired in thirty years a sinking fund of $6,000 a year would be needed, to be placed at compound interest for that purpose. Therefore the tax rate of the county must be so adjusted as to raise an additional $26,000 a year. A county that would spend $400,000 for good roads would probably have a tax valuation of some $8,000,000.

If three mills were added to the tax rate this would mean that each man would pay 3 cents for each $10 of his assessment. A man whose property assessment was $1,000 would pay $3 a year, the man whose farm was worth $10,000 would pay $30 and the millionaire would pay $3,000.

Having duly converted a given block of the bonds into cash which is deposited in the county treasury, the community is ready to go about the business of actually building the roads. It is at just this point that more mistakes are made in the expenditure of county bond money than at any other. The county has a road commissioner who is a highly respected citizen, an industrious worker and, according to local light, an efficient road man. This man is anxious to assume authority in building these roads. He wants them as a monument to his honor. The county commissioners have confidence in him. He is the accredited local authority in road-building. To him, therefore, is assigned the task of laying down this system of roads.

This is a mistake. The county that makes it may as well set fire to half the money it has raised! The commissioner of roads has lived regularly in this community of bad roads. He has done more or less practical road-building, but not on the basis of the task that is being assumed. His position is like that of a carpenter-builder in a village of lumber cottages who is suddenly called upon to erect a metropolitan

brownstone mansion. He may be the best sort of man in his sphere of usefulness, but this is not the task for him. It is such men as he who are wasting $40,000,000 on roads in the United States every year.

The bonded county should ask the advice of the state highway board and the Federal Office of Good Roads in selecting a road engineer to lay down its system. These offices have been studying roads from the broad national and international standpoint for twenty years and know many times as much about the problem as the county officials could ever learn. They are anxious to give the county the benefit of their experience. Some states, such as Virginia, are so anxious to prevent these mistakes on the part of the counties that they offer to pay half the expense of road construction if the county will build in accordance with the plans of the state highway commission.

The state or federal authorities are always able to recommend a road engineer who has had years of experience and with whose work it is entirely familiar. It has men available whom it knows to be efficient road-builders. These men may be employed for $2,000 a year or more, the amount depending upon the magnitude of the work. That salary may be saved in the construction of a single bridge. It guarantees an avoidance of the many mistakes that would be made by the local authorities. It guarantees a system of good roads and a

further installation of the right system of maintaining those roads. It means the good-road education of the community from the standpoint of all that is known about their building and maintenance. It means, furthermore, the use of the right material and its economical purchase.

From a bridge on the Potomac River to Lovettsville, Virginia, a distance of some ten miles, an excellent road has recently been built. It winds up a wash and is subject to much heavy hauling. It was built of limestone, which was hauled a distance of seventy-five miles. Yet the road runs through one of the finest outcroppings of trap that is to be found in the United States. Trap is the best material in existence for the building of heavy traffic roads. The local authorities, however, believed it was too hard to be crushed! They did not know that it was the favorite material of all experienced road-builders and was being crushed in more parts of the nation every day than is any other stone.

Road-building is an exact science. Only the men who have mastered that science should assume responsibility for spending large sums of money on it. The local authority is in all likelihood not a competent bridge-builder. Large sums of money will consequently be squandered on unfit bridges. Probably he is not able to estimate the drainage from a given area that will have to pass through a given culvert. As a result the road is overflowed and

washed away or its foundation is softened. He does not know how to locate roads and secure the proper grades; and the rains cut them to pieces.

The building of a macadam road is no small undertaking; it requires a proper grade, a proper crown, a proper foundation and a proper use of the right amount of the right material. The matter of the purchase of this material is vital.

Under any conditions it represents, delivered on the road, a considerable investment. That enough of it shall be used to produce a good road that will remain a good road and that none of it shall be wasted in a too liberal use—this constitutes a delicate problem that can be handled only by the man of long experience in just this work. The local authority who undertakes to lay down a system of roads usually makes all these mistakes and more. They may be avoided by consulting freely with state and national authorities and by obtaining a man of proved competence to supervise the entire work.

The federal government has prepared all this information for its citizens as one of the tasks that it has assumed that the whole people may profit from its munificence.

CHAPTER XII

COMBING THE WORLD FOR NEW CROPS

THE federal government in the Department of Agriculture, has a corps of workers whose duty it is to find out what plants there are in Patagonia, or Fiji, or Corea, or on the heights of the Himalayas, or down by the Persian Gulf, or anywhere else in all the world, that might be added to the things that are grown in the United States and thus increase the output of its farms.

These workers make up the division of plant introduction. There are about a hundred of them, in the central office and in the field. The important men of the division are scientists who know the secrets of plants, where they grow and where they might be grown, which could be made to yield money returns and which could not; how they can be packed for shipment around the world, and where they should be planted to grow upon their arrival in America.

The work of this division began about 1900. In a decade it had demonstrated its great value, for there were single crops that had been introduced through its efforts that were yielding many millions

of dollars each year. But it had shown even greater possibilities for the future. Many plants require much time for experiment and establishment. There are fruits that require a decade to get into bearing and a half century to determine the proper varieties for cultivation in given communities. For these reasons much of the important work of plant introduction must wait scores of years for results.

But there are many successes already shown. There is durum wheat, for instance, the greatest success yet demonstrated and one which was definitely proved within five years after the beginning of the work. A problem of the Department at about this time was that of combating a disease of wheat known as "rust." In damp years it often happened that whole crops were lost because of the ravages of rust. Not having found a way to fight the disease at home the government instructed its division of plant introduction to find, somewhere in the world, a wheat that was immune from rust.

An agent of the division penetrated to the far interior of Russia where the great steppes extend over into Siberia and the natives bear a striking resemblance to the North American Indians. Here is a vast wheat-producing area. Here also conditions are found that are remarkably like those of the Great Plains regions of the United States. There is so little rain that the man from America was greatly surprised to find that wheat might be grown. He measured the rainfall of the region and found it

no more than that of the Great Plains. There was no rust in the wheat for there was not sufficient dampness. The wheat was hard and flinty and productive. The agricultural explorer immediately saw the vision of what might be done in the Great Plains through the introduction of this wheat.

Quantities of the seed were sent home and soon the wheat was growing in the West. It was tried in such regions as the western parts of the Dakotas where the rainfall is such as to make crops uncertain. It was found that where the drought injured other varieties greatly, it injured the durum less, and where other crops failed entirely, durum still produced. So was it made possible to get heavier crops than before on lands where rainfall was light, and to grow wheat on great areas in the Dakotas, Montana, Colorado, Nebraska, and other states where the old crops could not otherwise have been secured at all.

But durum wheat had its discouragements. The millers of this country, for instance, put the ban on it because it was so hard that they could not make it into flour, they said. The Department of Agriculture showed them that it was done in Russia without difficulty, that it commanded a price there that was higher than for other varieties of wheat. The Department prophesied that the time would come when durum would sell for more in America. Yet the millers refused it and the introducers experienced the difficulty of supplanting something

already established with something new though better.

For a time there was a difference of twenty cents a bushel in the price of durum wheat and other grades. But eventually the millers adjusted their rollers to the requirements of its hardness and found that it might readily be ground. The time has already come when it is selling ahead of other wheats. It is estimated as adding to the productiveness of the farms of the Great Plains no less than $30,000,000 a year.

The work of the plant introducers with alfalfa has been no less striking and probably no less profitable, although the results are harder to measure. Alfalfa has attained the first place in the list of America's forage crops. The Moors took it from Asia to Spain, the Spaniards brought it to Mexico, and this country got its first plants when it annexed Arizona and California. There it thrived for many years, showing little tendency to spread eastward until the closing decade of the last century. When it started it spread to Canada and to the Atlantic.

But this alfalfa had staged its life history in warm climes and generally had been protected against drought by irrigation. As it traveled east and north it found severe conditions that it was unable to meet. It was not hardy enough for the Dakotas, nor could it thrive in the dry regions of the Great Plains. Yet both these sections needed just such a forage crop as it afforded.

At this time nobody appreciated the fact that there are differences in alfalfa. The agricultural explorers sent varieties of it from Africa and Asia and several of these were planted. The Turkestan variety of it had grown for years in a plot in Washington before it occurred to government scientists that it might have qualities that are not possessed by the ordinary kind. It was tried where it was needed, in the Great Plains region. It developed that this alfalfa had been grown for thousands of years in Turkestan, the climate of which is similar to the Great Plains region. It had developed capacities for resisting drought and for resisting cold. This ability was due to the fact that its first act when it started to grow was to send one big root straight down five or six feet. This enabled it to tap moisture far down or to nurse the spark of life below ordinary freezing depths. These abilities made it possible to grow alfalfa in parts of the Dakotas where the old variety would not survive and likewise in many of the dry states of the same longitude.

The powers of plant adaptation were shown in another alfalfa experiment that took place in Minnesota by accident but which has been worth many millions of dollars to the American farmer. A German by the name of Grimm came to Minnesota in 1857. He brought with him a very superior variety of alfalfa that was grown in Baden where he had lived. This alfalfa he planted in Minnesota

and it fared rather badly through the first years but Grimm was persistent. After twenty years it was noticed that Grimm had fat cattle when other farmers had none. Yet he raised no corn. Inquiry showed that his alfalfa was responsible for the advantage. Other farmers in his section got seed from him and developed alfalfa fields. Seed was obtained from other sources but the resulting plants were killed by freezes. There was something about Grimm's seed that gave it an advantage over others.

The scientists of the Department of Agriculture became interested, studied the Grimm alfalfa, traced it to its origin and got the German seed. This would not stand the freezes. Eventually the conclusion was reached that the German farmer, persisting through a half century, had developed a strain of sufficient hardiness to thrive in Minnesota. As only the hardiest plants could each year live, they only could bear seed. So each year the weaklings were removed, and, after a half century, all the plants in the Grimm stock were able to resist Minnesota cold. This likewise suggested the idea of searching for hardy strains in the cold regions of Asia, and in Siberia some wild alfalfas have been found that have survived cold and drought through the centuries. Some of these have a yellow blossom in contrast to the blue and purple of the well-known varieties. The division of plant introduction, in fact, has scoured the world and found many varie-

ties of alfalfa with different characteristics. It has not only brought them to America but has studied and cross-bred them until it has developed many new strains that combine the good points of the different cousins of this prolific family.

Establishing the date industry in the United States was a task of greater difficulty than either of those already described. The dates of Arabia and Persia and Egypt have been an important food for millions of people, in that part of the world, through many centuries. America had imported great quantities of prepared dates. But the idea of bringing this crop of the ancient East halfway round the world and growing it for western consumption was slow in germinating.

In fact the inspiration for the importation of dates came about almost accidentally. A scientific man of the Department of Agriculture, in charge of experimental work at the University of Arizona, casually planted the seed of commercial dates on the campus of that institution. The plant grew and was cared for as an ornamental tree. Eventually it came to maturity and, to the surprise of its originator, produced an admirable crop of dates. It showed that this crop of the East might be grown in the arid West.

In those days the possibilities of preparing and shipping living plants half around the world were little understood. A shipment of date plants was among the first. They came in huge tubs with

hundreds of pounds of the soil of Egypt about their roots. The process was expensive but successful. As good plants were later sealed in tubes and scuttled about the globe as freely as packages at Christmas time. These plants were set to grow at Phoenix, Arizona, and in the desert of southern California. They thrived and bore fruit. Then the Department took up a serious study of the possibilities of growing dates commercially, encountered many baffling difficulties, eventually conquered them, and in so doing learned more about dates than was ever dreamed of by the sheiks of the East.

In the first place it was found that given varieties of dates required particularly definite climatic conditions. A date variety was grown at Tempe, Arizona, with great success with the exception that its fruit ripened at a season of rainfall in that section, and this spoiled it. It was necessary to find a date for this section that ripened at a different time. Irrigating at the wrong time was found to cause blossoms to fall and fruit to fail to appear. The necessity of desert conditions was proved. Yet it was shown that the date would stand lower winter temperatures than the orange. Eventually the greatest setback was encountered, for a parasitic pest got among the date-trees and it long was thought that they would have to be destroyed to get rid of the pest and a new start made. All of the scientific lore of the Department was brought to bear on this pest and a way was found to fight it and

exterminate it without sacrificing the trees. Thus did the scientists of this government overcome in a decade a problem with which the wise men of the East had been battling unsuccessfully for four thousand years, for this insect still goes uncontrolled in Egypt.

In its study of types of dates and its attempts to find those that would fit into various conditions of climate in the Southwest, the Department of Agriculture sent its explorers to every part of the world where dates were grown and soon had every important variety fruiting in its experimental gardens. No agency ever before had made such a world study of this question and no men in the world to-day know as much about dates as do the scientists of this government. They are now prepared to unfold to the Egyptian and the Arab and the Persian many of the secrets of date culture which have remained closed to them through the centuries. Incidentally, the industry has been established in the Southwest and hundreds of growers have large groves of trees each of which is yielding its 200 pounds of dates each year.

The establishing of the Smyrna fig in America is an interesting romance of science, which baffled the experts for two decades and finally was accomplished through the aid of an insect as big as the point of a pin.

The Spanish Padres had introduced figs into the Southwest in those days when Captain John Smith

and Captain Henry Hudson were trading with the Indians of the Atlantic coast. There, as well as along the Gulf of Mexico, the figs had grown as dooryard fruits and had served no small purpose. Later attempts were made to grow them on a large scale and to market them in the dried form. Then it was discovered that there was on the market another fig so far superior that it was impossible for the American varieties to compete with it. This was the Smyrna fig of the Mediterranean. This country imported, during the nineties, an average of 10,000,000 pounds of Smyrna figs a year which sold on the market for twice as much per pound as did the California figs.

Yet the advantages of growing Smyrna figs had been appreciated for a quarter of a century. The trees had been grown in California and had thrived. But the fruit had fallen off before it came to maturity and the ingenuity of a nation of Yankees had failed to find out why it so deported itself.

As early as 1880, realizing the advantages of Smyrna figs over those in the state, a California newspaper had introduced and distributed 14,000 cuttings. They took root and grew prodigiously. When the fruiting time came innumerable little figs put forth bravely, grew to the size of the end of one's thumb, turned loose from the tree and fell. In the orchards established no single fig ripened.

At first it was believed that unproductive plants had been sold to the Californians to prevent them

from becoming competitors. Individual growers went abroad, superintended the collection of cuttings, planted them and waited anxiously through the years—and encountered the same failure. A decade passed with these fruitless experiments.

The next step toward the understanding of the situation came about with the discovery that the Smyrna fig in its native habitat is made fertile by being cross-pollinated with the caprifig, a wild fruit of no commercial value. This means that the pollen of the wild fig must enter the developing Smyrna fig or the latter will not mature. The Smyrna figs of California were falling from the trees because there were no wild figs to make them fertile.

This being demonstrated the growers came to the conclusion that they had but to introduce the wild fig into their orchards to make them productive. The Department of Agriculture shared this belief and many caprifigs were distributed for planting. The years passed and the caprifigs came to maturity and yet the Smyrnas refused to bear fruit. The growers and the scientists still were mystified.

One of the California growers, working upon the theory that the pollen of the wild fig must reach the interior of the Smyrna, actually got some of that pollen into a finely drawn-out glass tube, and using this as a blowpipe, forced it into several of the Smyrna figs. These clung to the tree and matured, being the first of their kind grown in the United States.

So it was proved that this cross fertilization was the condition lacking in the fig orchards. It was shown that there was a link in the pollination process present on the shores of the Mediterranean that did not exist in California.

Scientists and growers, knowing of the part that insects play in carrying the pollen from one flower to another, drew the conclusion that America lacked an insect that performed this important task abroad. Scientific study abroad proved this conclusion true and identified the insect. It is a tiny, wasp-like creature the size of the point of a pin but with a name bigger than that of the mastodon, for it is called "blastophaga." It lives in the wild fig but goes forth from its host at times, enters other figs that may be near, and carries the wild fig pollen with it.

The task of the growers then was to make a home for blastophaga in the United States. This would seem simple enough, but successful insect introduction depends on many conditions; such, for instance, as an understanding of the cycle of the insect's life and the providing of a home for it throughout that cycle. The growers and the men of science worked for years before this was accomplished. It was done through shipping to America trees of the wild fig already infected with the insect. Scores of such shipments were made without result until, finally, a consignment arrived at the right period of the insect's development, and it lived and went forth

and fertilized the trees nearby, and generations of it have carried the pollen of the wild fig about the orchards of the nation ever since.

So it came to pass, after twenty-five years of baffling experiment that the Smyrna fig was established and developed into an important industry.

There was a series of no less fascinating studies and experiments which led to the founding of the culture of Egyptian cotton in the hot regions of the Southwest where it to-day is growing lustily under irrigation and promises to become a staple crop of the region. This cotton is more valuable than the ordinary varieties, for its lint is longer, which quality gives thread or cloth made of it an added strength. It will not grow in the humid regions where much of America's crop is produced. Much study and experiment and cross-breeding was necessary before the right strain was developed. To-day, however, the United States has a variety of Egyptian cotton that is better than anything along the Nile, and its scientists know the secrets of combating its parasites as do those of no other nation.

There are hundreds of other introductions. There is, for instance, the avocado, a salad fruit from the tropics, that is slowly fighting its way to popularity. There is the tuber from which the poi of the Hawaiians is made and which supports as many people in the world as does wheat or rice. It has been introduced and now may be grown with

great cheapness. An explorer has found a persimmon of prodigious size in China and the scientists have found a way to rob it of its pucker, thus making it possible to use it while it yet is firm and will stand shipment.

Such are some of the accomplishments of the government in its attempts to bring to America whatever plants there are in the world that may yield it profits. The successes that already have been attained chiefly are among plants that mature in a single season and experiments with which may be worked out in a short span of years. A series of experiments in the development of such a fruit as the peach or the orange requires a generation for results, as there are from five to ten years of waiting between the time of planting a single specimen and the time of its fruiting. But with the work so thoroughly in hand the government expects that the next half-century will see the unfolding of many remarkable developments of the crops of its farms.

CHAPTER XIII

BLANKETING THE WORLD WITH WIRELESS

THE federal government, through the Navy Department, is just now busy with the task of unrolling upon the earth its blanket of wireless communication which will enable the President, as Commander-in-Chief of the fleet, to sit at his desk in Washington and chat with the captains of his ships on all the seas of the world, and to move those ships in war emergencies as a chess player would shift his pawns.

While the Navy Department has done this, primarily, as a part of its work in preparedness for war, the benefits derived are largely those of peace and humanity. For the great station at Arlington may pound out the warnings of storms at sea to ships of the Atlantic as far toward Europe as the Azores, may sift its warnings down upon all the tumultuous Caribbean, and reach the stations of the Pacific that its information may be relayed. The station at Panama may again send forth air messages that reach to Buenos Aires and to Newfoundland. Hawaii may pick up the messages from the American mainland and reach out with them to the

Aleutian Islands at Alaska's tip, and to Fiji, south of the equator. Samoa may drive forth the announcements of the epoch-making events of the world and these may be picked off at any of the palm-studded islands of the South Pacific and read by those expatriates of all the nations of the world who are lolling their lives away in these lazy lands of romance. Guam may send forth her call to Japan and Australia and all that sprinkling of islands that lie between, including 2,000 of the Philippine group that rest beneath the Stars and Stripes. Finally the station at Manila may take up the call and reach out with it to Bombay and to Vladivostok and give it the possibility of informing a billion men of the East.

This great network of stations may not merely hurl forth its messages of those events that are happening in the marts of the world. It plays, also, a listening part. It may pick up to-day the call for help of the ship that is stuck on some reef and may be able to direct other ships to the rescue. It may tell the story of some volcanic cataclysm that has brought starvation to an isolated people. It may direct a rescue party in its search for Arctic explorers welded into a world of ice.

For, since the world began, there has never been anything like radio for the sending of messages broadcast, nor for gathering in calls from the ends of the earth. Heretofore telegraph wires and cables have led their messages along single lines for great

distances. Other wires may have plugged into the circuit and picked off messages. These may have straggled out and burnt lines of communication that streaked a continent as a lightning flash does the sky. But always were they dependent upon given, man-made wires that stretched from point to point.

But here is set up a system that may have a single station as its center. One man may sit in this station and operate a key that brings together the electric poles that launch a message into the void. That message hurls itself instantaneously from this center as a ripple spreads from the point where a stone falls into a placid pool. For 3,000 miles it reaches in every direction, making a circle with a diameter twice as great. It covers one-fourth of the surface of the entire globe. There is not an acre in all that stretch where the message might not be received were an instrument set up that is suited to the task. Radio pours forth its flashes as impartially as the sun its floods of light.

The development of this remarkable method of communication has come about since the year 1900. Europe had been busy with experiments during the closing years of the past century but it was not until 1899 that wireless was demonstrated in America. In that year Guglielmo Marconi brought several sets of his apparatus to this country and it was first used in reporting international yacht races for a metropolitan newspaper. The Navy Department was asked to observe this demonstration of the possibili-

ties of wireless telegraphy, and its specially appointed board later reported upon it with enthusiasm.

Following the report of this board the Department placed two ships, the armored cruiser *New York*, and the battleship *Massachusetts*, and a torpedo boat, at the disposal of Mr. Marconi for further experiments. A shore station was established at Highland Lights, near the entrance of the harbor of New York. This was the first station on American soil and these vessels of the navy were the first to string wires among their masts for the launching of this sort of messages.

The torpedo station at Newport installed a system the same year. Studies of the various systems continued through 1902, and in 1903 twenty sets of the arc system of apparatus were purchased and installed. So successful were they that in the following year it was decided that the entire coastline should be covered with stations. The great stations at Pensacola and Key West were established. So rapid was the growth of the new method of communication in this country that by June, 1906, despite its late start, the United States had in operation more than half of the radio installation of the world.

As the ability to reach greater distances was developed many of the stations on the Atlantic coast were abandoned. Stations were established on the Pacific Coast at Point Loma, Mare Island, Puget Sound, and other points. It was at about this time

that the Point Loma station picked up messages that were being sent between the U.S.S. *Connecticut*, in Cuba, and the Pensacola station, and the ultimate possibilities began to dawn. The small station at Juniper, Florida, one day picked up a message that had originated in Alaska. Likewise did a torpedo boat cruising in the Pacific listen to the send of a station on an office building on Broadway.

At about this time, also, stations were being established along the Alaskan coast and were displacing the cable. From Sitka and Cordova and Kodiak the blanket came to be unrolled and through the long night of the northern winter these stations sent forth bulletins that were picked up by those towns of the inland that had long suffered a half-year isolation. Circle City, a thousand miles in the interior, put up its receiving apparatus and learned of the happenings of the outside world. Fairbanks, on the Yukon, listened for the glimmers of news. Rampart, and St. Michaels, and Nome, became news oases of the north.

It was at about this time that the government began to see the possibilities of a series of great stations that should enable Washington to keep in touch with its fleet at any point in the world where there was any probability of its being sent. It looked over the map with the idea of seeing how its accidental possessions would fit into a scheme of station arrangement that would reach all the seas.

It found that Key West and Panama extended

its reach far to the south and blanketed all of Latin America except, possibly, its remotest point, and all the waters round about. It found that Hawaii was in convenient radio reach of San Francisco and practically covered, with a 3,000-mile radius, the near Pacific. Samoa was in easy reach of Hawaii and made an excellent post for the South Pacific; but Guam was a bit hard to reach from either Hawaii or Samoa, as it was at a distance that was without the circle of easy communication under all conditions. With the prospective increases in distance that might be covered, the gap between Hawaii and Guam was not taken as overlong and it was figured that a scout ship might cruise between and act as relay if necessary. Guam to the Philippines was an easy step and these two stations took care of all the Far East. In fact the United States was particularly fortunate in possessing territory so well distributed.

It was with these stations in mind that the contracts were let in 1909 for the erection of the first great station at Arlington, just across the Potomac from Washington. In building this station the government refused to follow the designs of any of the commercial companies that were making similar installations at various points. One of these companies constructs a tower with antennæ extending from it in the form of an umbrella. Another builds a network of wires that cover twenty and thirty acres from low towers. The navy design

determined on for Arlington called for three towers, one 600 feet high and the others 450 feet, with the antennæ extending from one to the other.

When this great station was completed in 1912, it was found to be possible to communicate with all points between Cuba and Newfoundland with certainty equal to that of the telegraph. Under most conditions San Diego and Mare Island, on the Pacific Coast, were in ready reach. Panama chatted freely. Manaos, Brazil, soon reported that it picked up the Arlington signals every night. On certain occasions Arlington was able to catch the sending of the station at Hawaii, in the mid-Pacific. French scientists, during 1913, 1914, came to Arlington and each night signals were interchanged with Eiffel tower, in Paris. Twice a day, time signals were sent out from Washington and it was shown that these might be picked up by ships on more than half the North Atlantic. Soon the amateurs inland began picking off these time signals and setting their clocks by them. Soon a cheap receiving set was put on the market and these were purchased by individuals and corporations interested in the correct time and the Arlington station found itself regulating half the clocks in the nation. So did new opportunities for usefulness present themselves where they were least expected.

The construction of high-powered radio stations was an art so new at the time that the Arlington plant was installed that there is little surprise that

some material defects were found. Chief among these was the discovery that the towers had been placed too close together. They were but 350 and 400 feet apart. The discovery of the advantage of a greater distance between these towers led to a change in the plans for the great station at Panama which was the next to be built. Here the distances settled upon were from 850 feet to 915 feet. From the beginning the government determined to build one station at a time that it might profit each time by the experience previously gained. So was the Panama, the San Diego, the Hawaii, the Guam, and the Philippine station, each to be better than its predecessor.

CHAPTER XIV

DAILY MAIL IN THE COUNTRY

BENEFICENT Uncle Samuel has found a way of sending his mailman every day to the door of twenty millions of his nieces and nephews who live in the country in habitations so scattered that it requires an army of 43,000 men, traveling more than a million miles a day to reach them.

At the home of each of these may be left the daily paper, other publications that link them with the world outside, the letters of friends, communications from business associates, packages ordered. From them may be borne missives to the absent, orders for supplies, the produce of the farm to be delivered through parcel post to customers in the city.

All of which is no small service; for the farm, in the days of our fathers, was far removed from the multitudinous stir of the outside world and its isolation was prone to cause the dweller thereon to lose step with the times. Rural delivery was the first big advance toward the removal of this isolation. The telephone followed and did its share. Then came parcel post to provide the machinery for an interchange of commodities. So has the lot of that part of the population which feeds the whole been in a measure robbed of its heaviest handicap.

And rural free delivery blazed the way.

The size of this task of delivering the mail to the country districts is little appreciated. In 1914, twenty years after the first, small, experimental appropriation was made, $50,000,000 was being paid in a single year to the force employed to carry letters to the farmer. For the same year the pay of the entire navy, officers and men, amounted to $39,000,000. For the same year all enlisted officers and men in the United States army received $45,000,000. So had this organization, representing but one branch of the Postal Service, come, in two decades, to represent the expenditure in salaries of yearly amounts greater than those of either the army or the navy.

At the end of the first twenty years of its life the rural mail service had enlisted a force almost as large as the navy and more than half the size of the army, and with a larger pay-roll than either. There were about 43,000 men who every day hitched up their faithful Dobbins and jogged away into the country to carry the mails. If this force were concentrated, together with the members of the families of its individuals, it would outnumber the people making up the States of Wyoming and Nevada combined. Were these men, with their wagons, strung out in a procession they would reach for 200 miles. Traveling at the rate of twenty-five miles a day, which is standard for a rural mail carrier, it would take the procession eight days to pass a given point.

This body of men spins a web of intercourse that covers all rural United States except those portions that are very sparsely settled. Wherever there are a sufficient number of homes in a given community that a postman, in a day's drive, may supply one hundred of these with the convenience of daily mail, the Postoffice Department feels authorized in putting on a carrier. Forty-three thousand such have already been provided, and the area covered is a million square miles.

So it happens that in all the populous communities of the nation, these mail-carriers are every morning, regardless of weather conditions, hitching up their 43,000 horses. Having been supplied with the mail for their routes by other thousands of postmasters, they jog forth on their rounds. Were the distances they travel added together, it would be found that they travel every day, more than a million miles. Were their routes strung out they would reach forty times around the world at its largest circumference, the equator.

Each of these carriers is in reality a traveling postmaster. His wagon is an animated postoffice that bears the privileges of that institution to all who reside along the roads it traverses. The carrier's work is but part done when he delivers letters and papers to the farmers and collects those epistles that have been written by the people who live along his route. He carries in his wagon the stamps of all the denominations that are to be found in the post-

office and these he retails as does the stamp clerk himself. The registered letter may be as carefully receipted for by the traveling postmaster as at any office in the land. Whoever, on a rural route, wishes to purchase a money order, has but to turn over the cash to the carrier, receive a receipt for it, and in this way authorize the carrier to attend to the formality of the purchase when he returns to the office. Then there is that new branch of the postal service, the parcel post, in which the rural carrier figures as a very prominent personage. The parcel post brings the equivalent of an express service with reduced rates to the door of every farmer. The rural carrier is the expressman and it is his duty to handle all bundles, coming and going, as efficiently as does the agent of the express company in any city. Indeed the responsibilities devolving on the rural mail route man are not to be sneezed at and the 43,000 handling them are of necessity intelligent and reliable men.

Yet here is a governmental force which had no existence twenty years ago. There are millions of men who are yet young and who were reared on farms, who never heard of rural delivery in their youth. The present generation in the country is inclined to accept rural delivery as an institution that has always existed. But as a matter of fact its benefits are but of the last few years.

To be sure it had existed for a long time in the thickly settled sections of Europe before it was

suggested as a possibility in America. The first official mention that it received over here came from Postmaster General Wanamaker in his annual report of 1891. The first bill ever introduced into Congress that provided for its establishment appeared in 1892 and was presented by Representative James O'Donnell, of Michigan. This bill provided for an appropriation of $6,000,000 but was not taken seriously by Congress and never had any chance of passage.

In 1893 Congress included $10,000 in the Post Office Department appropriation for the experimental establishment of rural routes. The Department, however, made no use of the money. The following year $20,000 additional was provided. Still no action was taken. There was little demand for the routes and the Postmaster General complained that the amount was so small that nothing could be done with it. The money so appropriated thus accumulated. In 1896 an additional $10,000 was appropriated, making $40,000 in all. With this amount the Postmaster General actually established a number of experimental rural routes, demonstrated to rural Americans the virtues of a blessing that they had been missing, and started a demand for a service to the people by the government that was to increase like a fire in a haystack and become one of the very greatest of governmental agencies.

The actual birth of rural free delivery is, therefore, 1896. It was in that year that the

first routes were actually established. The first representatives of the Post Office Department to strike forth into the country with their mail pouches started from Charlestown, West Virginia, that village where George Washington built Harewood for his brother Samuel, which was named for his brother Charles, to which came to dwell also his brother John Augustine, and among the people of which there is to-day more Washington blood than anywhere else in the world. At about the same time routes were established from Uvilla and Halltown, also in West Virginia.

The advantages of the service were such that they had but to be experienced to be appreciated. So immediate was the demand for the establishing of other routes that the year 1897 saw eighty-three of them in operation in twenty-nine different states. With the years that followed came advances in the number of routes to 150, 400, 1,200, 4,000, 8,000, 15,000, 24,000, to numbers ever increasing at a dizzying rate until there were 40,000 routes. Then the rapid advances ceased and the growth became steady but continuous.

Could the fathers of rural free delivery have seen for a moment the gigantic figures of cost that were eventually to be piled up through establishing it, there would have been little chance of getting the first appropriations. But they saw but the small amounts for immediate needs and these were in but five and six figures. The tens of millions were

a later development and as they were appropriated the revenues of the Postoffice Department were likewise increasing. It was an institution practically on a self-supporting basis and which might, therefore, be granted the privilege of branching out.

The history of these first twenty years of development of the rural mail service may be best shown by a table which reveals the history of growth by the figures. It follows:

Year	Carriers	Mileage	Appropriation
1894	.....	.....	$10,000
1895	.....	.....	20,000
1896	.....	.....	10,000
1897	83	1,843	30,000
1898	148	2,960	50,250
1899	391	8,929	150,032
1900	1,276	28,685	450,000
1901	4,301	100,299	1,750,796
1902	8,466	186,252	4,089,075
1903	15,119	332,618	8,580,364
1904	24,566	552,725	12,926,905
1905	32,055	721,237	21,116,600
1906	35,666	820,318	25,828,300
1907	37,582	883,117	28,350,000
1908	39,143	891,432	34,900,000
1909	40,499	925,330	35,673,000
1910	40,997	950,000	37,260,000
1911	41,559	1,007,837	38,860,000
1912	42,081	1,021,492	42,790,000
1913	42,685	1,038,076	47,000,000

When the United States undertook to establish

rural free delivery it found precedent in Europe for the detail of it but it found no such service established on the stupendous scale that was demanded in this country. Areas to be covered are the point of greatest difficulty in such a service and in America distances are magnificently great.

It was found that England, including Wales, had rural delivery. Yet this area is only about equal to that of the State of Illinois. France has a much smaller area than California and Oregon combined. Germany could rattle around comfortably in the single State of Texas, while three nations like Denmark could be laid down on the map of New York. In fact the United States has an area greater than all Europe and is therefore faced with the task of providing rural free delivery extending over more of the earth's surface than all the nations of Europe combined. Thus may the size of the undertaking be appreciated.

Yet the very size of the country and the sparseness with which it is populated are matters that add materially to the blessing of rural free delivery. These conditions but increase the isolation of the people living away from the towns. That isolation has been one of the chief reasons for the desertion of the farm for the city and has made it difficult for the people of the farm to keep abreast of the times, to maintain the farm on a business basis.

Before the time of rural free delivery there were hundreds of thousands of homes in the United

States, located from five to ten miles from any town, with but few neighbors, whose only contact with the outside world was a weekly or semi-weekly visit to that town. There was little reason why they should not lose stride.

Now those people are visited every day by the mail-carrier. The farmer takes a pride in this new link to the outside world. He instinctively feels that he ought to be a patron of this new service. In most cases he has longed for the privilege of the daily paper. If not he subscribes to it because his neighbors do and because he wants the postman to stop at his gate. In either way he becomes a reader. The farmer has plenty of time. Every night he spends two hours over his paper. He reads the thoughtful parts of it. He knows his national affairs. He contemplates what he reads. He lives under conditions where thought is easy. He goes much deeper into matters than does the city man. The thinkers of the nation come from his class. This is because city people have no time for quiet meditation and therefore develop only a capacity for action.

All the members of the farm household are enabled through rural free delivery, to get the publications they want. The young and progressive farmer receives his agricultural journals regularly, his wife gets the woman's magazines, the children the funny papers. Intelligent men and women move into the country who would not have done so otherwise.

There is psychological suggestion in the daily call of the postman. The farmer is proverbially a man of little or no correspondence. But every time he sees the postman he is reminded of the possibility of writing and receiving letters. Since parcel post has been established he is further shown the practicability of ordering his supplies, the repairs for his machinery, of selling his produce through the mails. He begins this sort of correspondence and finds that he has saved himself a vast deal of inconvenience. He writes more and more. His reading and his writing are an education to him. He develops into a better citizen and a better farmer.

The enlisted army of rural mail-carriers, that body of men which approaches in size the military branches of the federal service and costs more money than either of these, what manner of men are they?

In the first place it may be said that these men are as nearly a native born, true American body as may be found in any work in the nation. The stock in America that has been here longest is mostly to be found in the country. The carriers are selected from the horse and wagon owning people in the communities where they are to work. Each individual must furnish his own horse and vehicle. He must pass a civil service examination, he must have the confidence of the people he serves, he must board himself and his horse.

For meeting all of these conditions he is remunerated to the extent of $1,100 a year. This would

A VERY RURAL MAIL ROUTE

UNCLE SAM'S FIFTEEN MILLION DOLLAR SET OF BOOKS

seem small pay to the average city dweller, but to the man who lives in the country or the small towns, it is an attractive possibility. His expenses are light. There is much competition for the places.

The rural mail-carrier of the present time considers himself a man of wealth as compared to his predecessor of a decade or two decades ago. Then the carrier furnished everything he furnishes now but received, at first, but $300 a year. As his numbers increased his salary likewise grew. There are those who claim that the concessions that came about so regularly to the rural mail-carrier were granted him because of his political importance. Here were tens of thousands of voters scattered throughout the country. They were likewise men who might easily be creators of public opinion. They have regularly received favors at the hands of all political parties. The following table will bear witness to the steady increase of their salaries:

Date of Increase	Salary per Annum	Date of Increase	Salary per Annum
August 1, 1897.....	$300	July 1, 1907.....	$ 900
July 1, 1898.....	400	July 1, 1911.....	1,000
July 1, 1900.....	500	September 30, 1912.	1,100
March 1, 1902.....	600	July 1, 1914.....	1,200
July 1, 1904.....	720		

CHAPTER XV

PRODUCING CENSUS FACTS

THE federal government, between 1910 and 1914, spent $15,000,000 for the production of the eleven books that contain the results of the taking of the Thirteenth Census. Each of these volumes cost more than a million and a quarter dollars. Each weighs about four pounds and contains a thousand or so pages. Each represents the expenditure of about 5,000 pounds of pure gold. So, it develops that each has cost more than a thousand times its weight in gold. Yet the government regards itself as having been wise in its expenditure.

This money has been spent for but one purpose—the development of information. These volumes contain but one thing—facts. Had the census not been taken these facts would not have been in existence. There is no other agency but the federal government that could have taken the census, and the facts were therefore obtainable in no other way. The federal government considered that the people would be well served through the development of this information. For the taking of a census

amounts to the making of an inventory of a nation with its people considered as the asset of first importance, and the government thinks it advisable that it should know what is on its shelves.

The people are counted and various facts with relation to them are set down. Uncle Sam wants to know where there are tendencies that are working to the betterment of the nation, that these may be encouraged. He wants to know where there are driftings toward the rocks of individual or national danger that steps may be taken to throw out the lifeline. He wants to take stock of all his people that he may know how to keep his house in order.

The census shows him how many people there are in the nation. It shows what they are all doing and how many are doing nothing. It shows him the nationalities of those who are breeding the Americans of to-morrow. It shows him whether the lands are going into the hands of the few or of the many. It shows him to what extent the people are concentrating in the cities. It shows him the thousands of tendencies of national life that mean advancement or calamity in the future.

Physically the making of a census is a gigantic undertaking. It required the building up of a force of 75,000 people to work for the brief period of from two to four weeks. This army of enumerators faced the

task of visiting every home in the nation, of reporting upon every individual with relation to nearly a score of points. The government wanted to know the name, color, sex, age, conjugal condition, place of birth, citizenship, occupation, literacy, and other vital facts for each man, woman, and child. Aside from this there was the special census on manufactures and on agriculture, each revealing the facts with relation to those so engaged.

But the gathering of these facts, while it required the spreading of a vast dragnet and its drawing in, is but a small part of the work of taking a census. The real task is the conversion of this information into usable shape. While the facts are gathered in from two to four weeks, the compilation requires as many years, spent in top-speed activity.

The scope of a census has always depended on the possibility of handling the returns and getting them in print while the information was still new. In censuses of the past the reports resulting have appeared as much as eight years after the enumeration. The facts handled in those early enumerations were always limited to the possibility of compilation in a reasonable time.

But during the last three censuses electric tabulating machines have made it possible to handle information with much greater rapidity than ever before. They have also made it possible to record more facts with relation to each individual and yet produce the result in time.

This mechanical phase of census taking can be but briefly touched upon here. It depends, in the first place, upon making a record of the facts with relation to each individual by punching holes in a card at given points, as a street-car conductor punches a transfer to indicate time and point of changing cars. It depends, in the second place, upon the interpretation of the meaning of those holes by an electrical machine into which they are fed.

The Census Bureau makes one of these cards with the holes indicating age, sex, occupation, etc., for every individual under the flag. These go into the tabulating machines. As they pass through those machines, each hole permits an electrical contact at a certain point of the journey. That contact causes the register of one count in the tabulation of the fact indicated by the hole. When all the cards have been put through, the sum total of all the individuals of a given sex, age, or occupation will have been registered. The machine makes this tabulation possible in a much shorter time than it could have been accomplished by old methods.

But even with the help of all such conveniences, it required four years to complete tabulation.

But the story of a census is not a recitation of the difficulties of its making. The great purpose that lies back of it, the good that results from the use of the information compiled, is the matter of importance. This may, perhaps, most properly be illustrated by indicating some of those vital facts

of the last census that may be used to the benefit of the race.

The eleven $15,000,000 red-cloth volumes are considered a closed book to the average reader. There are probably more readers of Sanscrit than of statistics. Yet most anybody could read the facts of these census tables had he but the courage to undertake the task. As a mere man of the street I dig into them and produce the following information which you must admit is interesting, sometimes startling, contains human interest, and even romance.

There has been, for instance, a lot of talk of recent years about the drift away from the farm and to the city. This tendency has been one of the movements that has been regarded as leading toward calamity for the nation. From census to census there are no facts upon which may be based a conclusion as to whether the tendency is augmenting or decreasing. But for the census there would be no determining this tendency. Yet every man has a sufficient interest in the well-being of his country to want to know the present status of this matter. Those men in public life, knowing the tendency, might find a way of avoiding calamity. The individual could throw his mite toward prevention of calamity by supporting legislation that pointed the way.

Well, here are the facts: In 1910, 46.3 per cent. of the population lived in the cities. Ten years before but 40.5 of them were city dwellers. The gain was

nearly 6 per cent. in a single decade. This gain was 2 per cent. greater than in the decade that preceded. If the figures of 1900 were alarming, those of 1910 are doubly so. The most calamitous tendency of the nation is being accelerated.

Even so interesting a subject as matrimony, and the possibilities of accomplishing it, can readily be illuminated from the census reports. It would seem that the women of the nation need not despair of the chance of marriage. There are, in the United States, 106 men to every 100 women. All the women might get married and still six men out of each hundred would, of necessity, remain single. Were every female in the United States married, there would still be 2,822,809 unmarried males, for this sex is to that extent in the majority. The chance for women to marry is much better than in Europe where there are but 96 men to every 100 of the opposite sex.

As a matter of fact there were, in 1910, 8,000,000 unmarried men above the age of twenty and but 5,000,000 women to marry them. The deadliness of the few years that follow the arrival at maturity may be shown by the fact that there were but 4,600,000 unmarried men above twenty-five. There were 2,700,000 women as possible spouses for them, indicating excellent matrimonial opportunities for women, but less favorable conditions for the men.

Were a young woman of marriageable age to look about for a community where matrimonial possi-

bilities were greatest, her best guide book would be the census reports. She would put the ban first on the District of Columbia. There are but 90 men to 100 women in the nation's capital, it therefore taking first rank, from a feminine standpoint, as an unfavorable matrimonial market. Even in Massachusetts and Rhode Island there are 94 men to each 100 women. North and South Carolina are the only other states where the women are in the majority. As one goes west the predominance of the men increases. In Kansas there are 111 men to 100 women; in Oklahoma, 118; in Arizona, 135; in the State of Washington, 163; while Montana suffers from the greatest female famine of them all, with 187 men to each 100 women.

If one turns to the tables of illiteracy, the gratifying fact is revealed that there are fewer illiterates in the nation to-day than there were in 1880, despite the doubling of the population. An examination of the table of illiterates shows the rather startling fact that of the native born of native parents there are 3.7 per cent. illiterates, while of the native born of foreign parents there are but 1.1 per cent. of illiterates. So is it indicated that the child of the immigrant is making better use of its educational opportunities than is the child of the native American. Of the negro it can be said that in a single decade, from 1900 to 1910, the degree of illiteracy was reduced from 45 to 30 per cent.

One of the first facts revealed in the census of

agriculture was that the farm lands of the nation had increased in value in a single decade by just 100 per cent. There were but a few, very small communities where the increase had been less than 25 per cent. All that great block of land from the Atlantic to the Missouri River represented an advance in value of from 50 to 100 per cent. West of the Missouri half the land is mapped as increasing from 100 to 200 per cent. while the other half increased more than 200 per cent. The increases in farm land values in this single stretch of ten years are such that if presented to the average man of business by a dealer in lands, they would have little chance of being credited. The census shows it all in a map that has one sort of shading for a certain increase and another shading for another increase and the whole thing may be seen at a glance.

But 46 per cent. of the land of the nation is now in farms, and of this but 54 per cent. is actually cultivated, so there would seem to be plenty of room for agricultural development. Yet the area in farms for the ten years increased but 4.8 per cent., which was by no means in proportion to the increase of 21 per cent. in the population of the country.

The United States, as a new country seeking to avoid the mistakes of those that have gone before, has taken much thought of the hands into which its lands fall. It has appreciated that the ideal arrangement is that under which the land is owned by the man who tills it, rather than by an absent landlord

renting it to a tenant. The difference is largely in the citizenship developed. One system creates independent land owners and the other dependent serfs. There is also the difference of better farming on the part of the man on his own soil.

As far back as 1880 the tenant farmer began to appear in sufficient number to alarm those men who have seen the vision for America. The census of that year showed that 25 per cent. of the farms were operated by tenants. In 1890 this had increased to 28 per cent. and in 1900 to 35 per cent. The facts for 1910 were awaited with much anxiety. They showed 37 per cent. of the farms worked by tenants. This is not an alarming increase and was probably lessened by the particularly prosperous times among farmers which enable tenants, in many cases, to purchase homes. Yet it is a definite increase.

As the census was being compiled Congress turned its attention to the matter of rural credits. The census of agriculture produced the facts as to farm values, farm mortgages, farm production. These were the basic figures for the laying down of a credit system and there would have been no such information in existence but for the census. So are some of the purposes it serves revealed.

An interesting fact developed in this enumeration is that the farm which is mortgaged yields better crops than that which is not. It has a working capital, live stock, implements. Statistics show

mortgages to be as effective as fertilizer. The owned farm yields better returns than that farmed by a tenant, the long time tenant gets better returns than his fellow who moves every year. This latter individual is the worst farmer of them all. He makes no effort to maintain soil fertility, to keep up fences and buildings, to build up the community through such developments as good roads, to do justice to his children in the schools. The one-year tenant is the hooligan of the farm.

The agriculture census has a thousand applications. It should be explained that the facts by states and by counties are compiled and are issued separately in pamphlet form. There is a pamphlet for each state. If a New Yorker is contemplating moving into a certain county in Kansas, he may ask the census bureau for its agriculture bulletin on that state and from it may learn exactly everything that is produced. If a manufacturer of milk cans is sending out salesmen or placing advertisements he may determine the advisability of campaigning in a given field by getting these pamphlets and ascertaining the number of dairymen operating thereabouts.

Population, agriculture, and manufactures are the three large items covered by the census. Here are the people and the two basic industries. Four volumes of the $15,000,000 set of books are given over to the people, three to agriculture, three

to manufactures, and the final, small volume on mines and quarries.

The books on manufactures would seem to be a dry subject also. Yet it puts forth just the tasks to which all the people have set their hands. It shows an increase of 30 per cent. in the number of manufacturing establishments as against the 4 per cent. increase in farms, thus showing the national tendency toward manufacturing. There were, in 1909, 7,600,000 people employed in these industries, getting more than $4,000,000,000 in annual wages and turning out a product worth $20,000,000,000.

The increase in the value of this product in a decade was $9,000,000,000.

The industry of them all that adds most wealth to the nation is the foundry and machine shop. Lumbering ranks second and, though it might not have been suspected, printing and publishing comes third. The value of the output of the packing houses is greater than any of these, but the raw material was comparably more valuable and the process of manufacture did not add so much to it.

The facts about any conceivable article of manufacture are readily accessible. This information is particularly valuable to Congress when tariff schedules are being considered. If it were proposed to take the tariff off of some obscure article as, for instance, oakum, the man engaged in that production might cry out that an industry would be ruined and all the people supported by it forced into idleness.

Without a census the Congressman would have no idea of the damage done were this true. With the census at his elbow, he turns to oakum, whatever it may be, and finds that there are six factories producing it, that they employ 113 people and that their annual product is worth $338,000. He has these facts as a basis for action.

Great numbers of facts with relation to any industry are on file. States and cities are tabulated with reference to their importance in given industries. It is shown that St. Louis is increasing rapidly in the boot and shoe manufacture, that automobile manufacture increased fifty fold in a decade and that the single city of Detroit in some way got nearly one-fourth the nation's business. Connecticut makes about one-fifth of the clocks and nearly one-twelfth of the corsets of the whole country. Practically all the grindstones come from Ohio, as does almost one-half the manufactured rubber. Every table indicates a romance of business.

The constitution of the United States provides for the taking of the census. The original purpose back of this provision is the determination of population as a basis of representation in Congress. The census still performs this service but the development of those great facts that underlie our civilization and indicate the trend of national life, have come to be recognized of vastly greater importance.

Census work was not on the basis of a permanent bureau until 1902. Its organization had formerly

gone out of existence when the work of each ten-year census was finished. But the demands for the compilation of other facts were such that a law was passed which made the bureau permanent and assigned certain work for the reduced force between decades.

It was decided that the census on manufactures should be taken each five years. Congress also required the collection and compilation of an annual report on cotton ginning. It was determined that an annual report on the financial statistics of cities of over 30,000 population should be published.

This latter opened up a most useful and interesting possibility. The study of municipal economy is important in every urban community. Each city government would like to compare its schedules of expense with those of other cities of similar population. Each city government, with the figures in hand, could see at a glance what municipalities were operating police departments, fire departments, sanitary services, or any other of the ordinary branches of work, on the most economical basis. Those cities, if their services were found efficient, should furnish valuable object lessons. Among all the cities might be picked, from these reports, those that were most efficient in each branch of work, and a given municipality might combine the good points of each in a single administration. Thus is shown another advantage of the possession of facts.

The Census Bureau is also engaged in the collec-

tion of vital statistics—the facts of birth and death. If those interested in healing, know, for instance, that 100,000 babies die each year of summer complaint, there is the opportunity of a concentration of effort on that disease. Summer complaint is due entirely to feeding the baby wrongly. These 100,000 lives could be saved each year if the mothers of the nation could be brought to feed their babies properly. The method of accomplishing this end would appear to be a campaign of education. The development of the facts points to this great need. So is an application of such information shown. So is revealed the human side of so forbidding a thing as columns of figures.

The taking of vital statistics lies in the province of the state. Few of the states, in this country, require the reports of births and deaths. The Census Bureau is urging all the states to make this requirement. So would the central government be given this valuable information for the whole country. It is one of the movements that is being fathered by this branch of the federal government. It has as its object, as have so many of the activities of Uncle Sam, the betterment of the condition of all the people.

CHAPTER XVI

ACCUMULATING HOARDS OF GOLD

EVERY working day in the year a hypothetical dray backs up to the mints of the United States and unloads a ton of pure and refined gold. The mints of the United States regularly consume such quantities of the yellow metal as a large-sized hotel consumes of coal. The nation is buying this standard of value by the ton, and never does a day pass without the purchase of such an amount as would make a good two-horse load of it.

Treasury statements for the past years show that the United States is piling up in its treasure houses such amounts of gold as would make the wealth of Midas and Crœsus look like the paltry change for an afternoon's shopping. The wealth of its stores is amounting to such stupendous figures as would make the gold of "Ormus and of Ind" pale into insignificance.

The balance sheet shows that the United States has already put aside a thousand million gold dollars, coined and ready for use. These actual gold dollars

are snugly tucked away in her mints and treasuries. Aside from this, she has $300,000,000—or more than 500 tons—in gold bullion ready for the coining. Then there is the matter of $700,000,000 in coin that is being circulated among the people and held by banks. Altogether, the gold of the nation is worth nearly $2,000,000,000.

Two billion dollars is a term too large to be grasped by the intelligence of man. To appreciate the amount of this gold it must be reduced to grosser terms, it must be translated into the large measures in which the bulky things of ordinary life are handled. A beginning may be made by stating that a thousand dollars in gold weighs just 3.86 pounds. Forty thousand dollars would weigh a little over 150 pounds, and might be carried upon the shoulder of a man of average strength. So it would require a force of 50,000 men, or as many as those enlisted in our navy, to shoulder the actual gold of the nation. The largest force that worked on the Panama Canal could just about pick it up. It would break the backs of the populace of any of our cities of 100,000 people to carry this gold a block.

The gold of the nation would weigh about 7,720,000 pounds. This would make 128 box-car loads of the precious metal, for a box-car is supposed to haul 60,000 pounds. To pull this 3,860 tons of pure gold through the paved streets of one of our cities would require about 4,000 horses, and these teams

would stall if they got onto the comparatively bad roads of the country districts.

Such is a sort of measure of the gold for money that is in the baby nation of the West at present. There is not a nation on the earth that begins to approximate the amount. In France there is a little more than half as much, and Russia has about the same amount as France. These two nations taken together would have a little more gold than has the United States. There are, however, no other two nations whose combined gold stock can approach that of the United States. The stores of Great Britain, Germany, Austria, and Italy combined are less than those of the United States. The United States is the Crœsus among nations.

The United States has been riding upon the very crest of the great, golden wave that has been sweeping the world for twenty years. For, in the past two decades, sterile lands on many continents have been awakening from a drowse of æons, have been showing their hidden charms to the venturesome spirits of many nations, and those adventurers have been garnering that unsuspected wealth. This latent gold has found its way into many activities and the whole world has become possessed of that fever for accomplishment which is bred of success.

For the world was poor in gold at the middle of the nineteenth century. In 1850 there was less than $300,000,000 worth of gold in the whole world, and

this included all gold plate and jewelry. Uncle Sam has one little mint out in Denver that contains nearly twice as much gold as the whole world possessed sixty years ago. The world is now producing every six years more gold than existed in the hands of man at that time. The stimulus for gold production was then not great, for the nations of the world were not using it as a basis of their money circulation. The Bank of England then had a paltry $85,000,000 in gold, while the Bank of France had $15,000,000. Despite the fact that these were the palmy days of the California gold fever, the world production was only a little over $100,000,000 in gold a year. In fact, with little fluctuation, this small yield of the yellow metal held up to the dawning of the golden era of the world, to the coming of the past score of years.

In 1890 the world produced $118,000,000 in gold. That was the last of the old conditions. That was the dawning of the golden era. For from that year the tide of the yellow metal has been bearing in upon the peoples of the civilized world in an ever-increasing flood. By ten and twenty and fifty millions a year did the increases mount until in seven years production had doubled and twenty years showed a production of nearly four times that of 1890. A table of ever-increasing production will tell the tale of the mounting golden tide, until 1913, when production fell slightly. It is here given:

Year	World's Production of Gold	Year	World's Production of Gold
1890.....	$118,848,700	1902.....	$296,048,800
1891	130,650,000	1903.....	325,527,200
1892.....	146,651,500	1904.....	347,150,700
1893.....	157,494,800	1905.....	380,288,700
1894.....	181,175,600	1906.....	401,973,200
1895.....	199,404,100	1907.....	410,550,300
1896.....	202,956,000	1908.....	442,646,200
1897.....	237,504,800	1909.....	454,422,900
1898.....	286,879,700	1910.....	454,703,900
1899.....	306,724,100	1911.....	466,000,000
1900.....	254,576,300	1912.....	466,136,000
1901.....	260,992,900		

But this 870 tons of gold that is being produced every year. Where is it going? The answer is that it is going into the treasure houses of the nations. In 1890 there was comparatively little gold in the vaults of the governments of the world. It was about that time that the great nations began adopting gold as the basis of their currency. Since that time practically all of them have gone upon the gold basis. They needed great stores of this measure of value to hold in lieu of certificates of credit issued against it. The treasure vaults of all the world were opened to gold and gold responded at just the right moment and has been pouring unceasingly into them.

So has it recently come to pass that here and there the world around have been concentrated great amounts of yellow gold. The United States has

vastly more of it than any other nation, but this is split up among a dozen mints and treasuries in such a way that this country may not claim the greatest amount of it under a single roof.

This distinction belongs to France and to Russia, which nations have about equal amounts of gold. The Bank of France and the Bank of Russia are the greatest single treasure houses on earth. There is about $800,000,000 in gold in each of them, and concentrated under a single roof in each case. In these treasuries there is stacked up some 1,150 tons of gold in each case. It would take a man with a good wagon and team something like two years to transport this money a dozen blocks as wheat might be hauled from one granary to another.

After these two great banks there is more gold in the mint at Denver than at any other one place in the world. In the new treasure house of that mountain city there was, on the first day of the year 1914, $510,000,000 in gold. Most of this gold was at San Francisco at the time of the earthquake and fire at that point. Had the mint at San Francisco dropped into a crack in the earth at that time more than $300,000,000 in gold would have been lost. But this greatest treasure of Uncle Sam remained intact. Afterward it was decided that Denver was a safer city, not only from the earthquake standpoint, but because of its immunity to attack in time of war. The wealth of the Denver mint would be no small treasure to be captured by

a nation with which the United States was fighting.

Uncle Sam found himself so weighted down with his wealth at San Francisco that it was no mean task to transport it to Denver, a thousand miles away. In fact there were 580 tons of this gold to be moved. This would make up one freight-train of twenty snugly loaded box-cars. But Uncle Sam was unaccustomed to shuttling solid freight-trains loaded with gold from one part of the country to another, so he decided to let this transportation business out to an express company. He found one that could give an iron-clad bond for a carload of gold, and allowed this company to take the money through in piecemeal, which it finally did.

In the Denver mint there are twin tiers of vaults that are made as forbidding and immune to attack as it is possible to build them. There are some thirty of these vaults. In eleven of them there are sealed $30,000,000 each. When the money is once checked in, these vaults are sealed in such a way as to make access to their contents possible only through the most elaborate ceremony. Other vaults have smaller amounts. Finally there is about $100,000,000 in gold bullion stored away at this treasure house, for Uncle Sam is not now coining all his gold. Altogether the wealth of the Denver treasure house is greater than that of any other store in America and threatens to soon surpass the treasures of France and Russia.

The mint at Philadelphia is the second greatest

of Uncle Sam's treasure houses. In it is usually to be found $300,000,000 to $400,000,000 or something more than 600 tons of gold. At San Francisco there is $170,000,000 in gold; at Chicago, New York, St. Louis, and the different mints and assay offices, are to be found various odd millions in coin and bullion.

The nations of the world, being on a gold standard, are pledged to buy all of that metal that is offered. The United States is now getting about $100,000,000 of it a year and at that rate will double her treasure in twenty years. In that time the supplies in the mints will be such as to make those of the present look paltry. At the very lowest estimate it seems safe to say that a billion dollars will be added to the hoarded gold of this nation every decade. By the end of the century, at this rate, we will possess $10,000,000,000 in gold. The storehouses will have to be enlarged that there may be places to pile the ever-incoming stream of yellow metal. In two and three centuries the wealth of it will be beyond conception, for the figures of to-day stagger the imagination.

There is a strapping son of Sweden, named Hanson, who works in the coin vaults at Washington. His sole business is to pile great sacks of money one upon the other. Coin in the great vaults is as treacherous as quicksand. These bags of silver and gold must be carefully deposited or the mass is likely at any time to shift and come tumbling down

upon the heads of the workers. Not long ago a worker in the mint at San Francisco was crushed and killed by having $9,000,000 in gold fall upon him. The trained men who work in these vaults are ever watchful for the rattle of shifting coin which gives warning of the approaching collapse of a great stack of money. Hanson is a past-master of the art of so piling these stacks of coin that they will lie safely in place. He tosses the sixty-pound sacks about as though they were playthings; and wherever they are placed, there they may be depended upon to stay.

So the calling which Hanson follows may be expected to increase as the years pass. The gold production of America goes steadily on. Africa, which has loomed large in the yield that has given the world its golden era, is still turning out its yellow flood without abatement. Australia shows an occasional fluctuation, and Mexico lost her stride because of war. All the time, however, there are new fields being developed and all the time there are greater chances of new discoveries, for the world is being prospected now as never before.

Another element that has largely influenced the output of gold is the improved and cheapened methods of milling. Since the cyanide method of reduction came into use at about the opening of the golden era, hundreds of mines that might not previously be worked have become economically profitable. So may new methods in mining make it

possible in time to work ores that are to-day too low grade to pay, and so may the ever-increasing production be augmented.

This out-pouring of gold had the effect of furnishing a medium for the transacting of business just as the world was awakening into an era of unprecedented trade expansion. To get this idle money so created into use, the banks reduced their rates of interest to a very low level. Borrowers immediately appeared and soon this money had found its way into business. Shipbuilders were particularly active. This opened up new avenues of trade and new outlets for activity. The farmer and the merchant followed the gold miner and production along general lines took the place of seeking after gold. So has the appearance of great quantities of gold within the decades since 1890, unleashed industries without number.

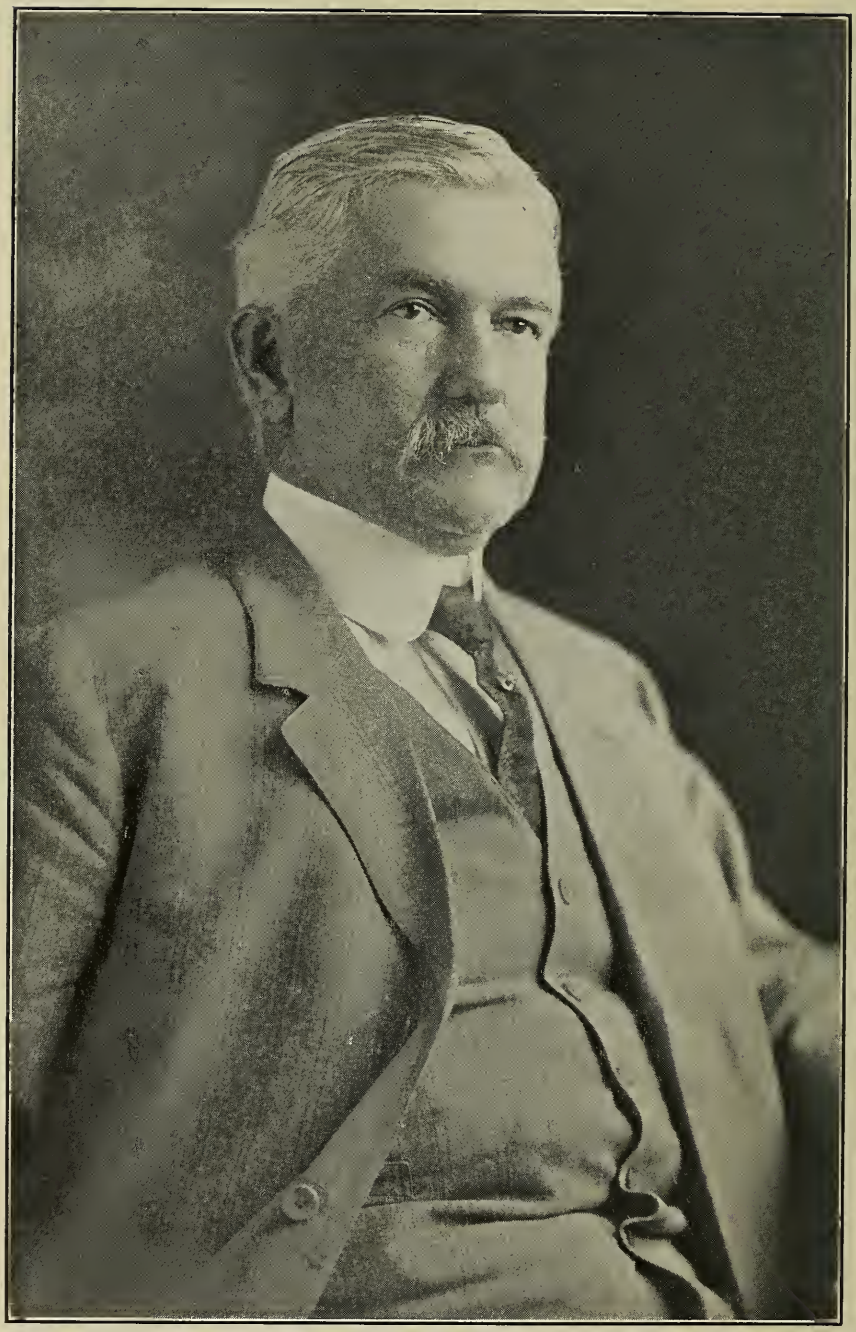
For all this mass of increasing gold piling up in the United States Treasury, one man is responsible personally. The Treasurer of the United States gives his bond for its safe keeping. His commission states that he shall be responsible for all the moneys in all the treasuries and that in case of the loss of any of it he is adjudged criminally liable. His only relief from criminal prosecution under the law would be through Congress. If a dynamiter in San Francisco blew open a vault in the mint and stole a bar of bullion, the Treasurer could be held for embezzlement under the law.

The director of the mint is the next man in responsibility for the gold of the nation. It is under his supervision that the bullion is changed into coin. All the machinery that operates this change and all the safeguarding that must of necessity surround it are under the direction of this official.

These two men sit in their offices in Washington and watch the flow of the yellow gold. They feel the rush of it and prepare for the care of its vast volume. They are the men who are estimating the storage needed for future hoards. They are the men most likely to look into the vista of the future and wonder what will be the end of the flood of gold that is mounting ever higher. But it is not for them to speculate upon a gold-glutted future and possible results of that surfeiting upon the history of business and of nations. It is not for them to say that the present high price of necessities is or is not due to the presence of great quantities of gold and a consequent cheapening of that standard of value. This is a field equally profitable for the political economist and the romancer, and the one throws down the gauntlet to the other.

The American, however, may take a bit of pride in the fact that his country has outstripped all the world in the acquiring and storing of this standard of wealth. If a nation may be measured by its gold, the United States is as great as any two of the other powers of the earth.

EIGHT MILLIONS IN GOLD IN A CORNER OF UNCLE SAM'S TREASURE HOUSE



COL. WILLIAM CRAWFORD GORGAS

CHAPTER XVII

TEACHING SANITATION TO THE WORLD

WHEN the final measure is taken of the accomplishments of the present generation in which the people of the United States have played important parts, precedence will, in all probability, be given to the work of sanitation with particular reference to the work done in the tropics.

Those fifteen years that followed the Spanish American War may well be set down in history as the era of sanitation. The science of preventing disease developed more in that brief span than in the two centuries that had preceded it. It developed more because of the activities of men of medicine in the employ of the United States government than because of all the efforts of all other men of all other nations combined.

It fell to the lot of the men of the Medical Corps of the Army, particularly, to be the instruments in bringing about such revolutions in the methods of preventing and treating disease as the world had never before known. Because of their efforts the world to-day stands unafraid in the presence of that plague of the tropics, yellow fever, which had run riot perennially in equatorial climes and had constituted an ever-present source of dread in temperate

ports through each recurring summer. Because of their efforts typhoid fever, a world-spread disease of great fatality, was first deprived of the secret of its transmission and, ten years later, utterly routed through vaccination. An army doctor discovered that the languor of many millions of peoples of the tropics was due to the presence of the hookworm and demonstrated the simplicity of a cure that would bring those people back to lustiness. It was these army doctors who showed the world through most spectacular demonstrations that tropical cities, regarded as pest holes of contagion, might be made as safe to live in as Paris or Washington, and therefore pointed the way by which the ban might be removed. It was the men of the army medical corps who shamed those European nations that have governed colonies in the tropics for two centuries and allowed disease to run on unchecked. For the United States had been in the tropics not a decade when it had demonstrated more results in battling disease than all Europe had been able to show in 300 years.

The demonstration of which is but another of those many reasons why the American should be proud of his citizenship and should stand uncovered when the flag flings out. For that flag is a benediction that brings unto the people beneath it definite, appreciable blessings which are none too well understood or there would be more men at the polls on election day.

It all began when three army doctors got their heads together in a barracks for American soldiers at Pinar del Rio, 102 miles from Havana, in the year 1900. The fortunes of the Spanish-American War had forced American soldiers into the tropics. There they had contracted tropical diseases of which our surgeons knew little. But soldiers were sick and the men responsible for their health refused to accept such a condition as being final. To be sure the great nations of the world possessing colonies in the tropics had done so. The United States refused to play a similar rôle. It had designated these three men to find the secrets of yellow fever and the methods of stamping it out.

The story of Drs. Walter Reed, James Carroll and Jesse W. Lazear, has been told many times. All other theories of yellow fever having been exploded, they were here to determine the truth or fallacy of that which held that the disease was transmitted by mosquitoes. There was yellow fever in the barracks. Mosquitoes under observation should bite the patients and should then bite well men. The result would prove or disprove the theory.

There was, of course, great danger to the persons subjecting themselves to these experiments. The doctors decided that, before calling for volunteers, they should subject themselves to the ordeal. In this way it happened that Dr. Carroll was the first individual developing yellow fever from the bite of a captive mosquito which had been allowed to bite

a patient. He was stricken and successfully ran the gauntlet to recovery. Dr. Lazear sat in the yellow fever ward during the illness of Dr. Carroll. A mosquito alighted upon his hand and the experimenter allowed it to drink its fill of his blood. As he watched, the little insect wrote his death warrant, for he came down with a virulent attack and died in most terrible agony. So were the first two bits of corroboratory evidence obtained.

Drs. Reed and Carroll built two lumber shacks and pitched a row of army tents on a Cuban hillside where they might carry on further experiments free from outside influences. The station they named Camp Lazear. From troops at Pinar del Rio they asked for volunteers for the mosquito experiments. All these troopers knew of the fate of Dr. Lazear and the dangers of death that lay in the work. Yet there was no dearth of men ready for the possible sacrifice. John R. Kissinger and John J. Moran, two healthy youngsters from Ohio, were selected as subjects. They were told of the monetary reward that awaited them and refused it. They faced the death for humanity's sake.

Kissinger was bitten by mosquitoes, contracted the disease but recovered. Moran's rôle was to sleep in the beds and clothing of men who had suffered yellow fever, who had died from it, and so to determine whether it could be transmitted in that way. He failed to contract the disease in twenty days spent in one of the shacks well supplied with

such articles. He later took it from the bite of a mosquito. So were the facts worked out.

This information threw the first real light upon the proper methods of battling the disease. The quarantine authorities of this nation, for instance, had depended upon fumigating clothing and effects which were thus shown incapable of transmitting the disease. Since 1793, when yellow fever raged in Philadelphia, there had been 100,000 recorded deaths from it in this country, and all the seaport cities had suffered. New Orleans alone had lost 40,000 people, while in Memphis there were 8,000 deaths in the outbreak of 1879 alone. The appearance of the disease was constantly expected at all the Gulf ports. The financial loss due to the interference with business on account of quarantines was enormous. The outbreak of 1879 was estimated as causing a financial loss of $100,000,000. All tropical America was constantly at the mercy of the disease and knew no way of fighting it. It was into a situation of this sort that the discovery of Reed, Carroll, and Lazear precipitated itself.

Havana had always been the chief point of infection for the United States. In that city there had not been a year or a month for a century and a half that yellow fever had not been known to be present. There had been, during all that time, an average of a death every day from the disease.

At that time Colonel W. C. Gorgas, who was later to become sanitary officer for the Panama Canal,

still later to be made Surgeon General of the United States and who was to earn the reputation of being the world's greatest sanitarian, was the health officer for Cuba under the American occupation. It therefore fell to the lot of Colonel Gorgas to make the first fight against yellow fever in the light of the demonstration of the mosquito theory.

Colonel Gorgas confesses that, while he had witnessed the demonstrations of Reed and Carroll and was convinced that the mosquito carried the disease, he was by no means convinced that it was the only method of transmission. He had already been in Havana for three years and that city had been made a clean and wholesome community. This cleaning up had, however, failed to have any effect upon yellow fever. So, in 1901, he added to his other sanitary measures a campaign against mosquitoes, expecting thereby merely to reduce the disease. He was amply provided with means and the fight was most thorough. The work began in January which is the period of least danger from the disease. There were seven deaths that month. In February there were five. In March there was but one death. Then came April, May and June with no deaths. For the three months that followed there were two deaths each. Then yellow fever passed. The months that succeeded showed no cases in the city. No one was more surprised at the absolute result than was Colonel Gorgas. There were no conditions in the methods of sanitation

that were different from the three years previous except the mosquito campaign. Mosquitoes alone were thus shown responsible for the disease. So was demonstrated to the world for the first time the possibility of ridding a tropical city of this dread disease through a campaign that meant the doing away with the mosquito.

When Colonel Gorgas went to Havana he found that out of each thousand of the population ninety-one persons died every year. This is a frightfully high death rate from the standpoint of a city in the temperate zone, but the municipalities in the tropics had come to accept it as a matter of fact. Within a year the death rate had been decreased to thirty-three per thousand and in 1902 the death rate was down to twenty per thousand. This means that four and a half times as many people were dying each year before the Americans took hold of the health affairs of the city as four years later. Some of this decrease was due to the passing of yellow fever but much of it was because of the absence of other diseases under sanitary conditions. So was an object lesson given to all the tropical cities of the world.

Had it not been for this demonstration it is doubtful if the United States would ever have undertaken the construction of the Panama Canal. But for this demonstration it would probably never have been possible to build it even if undertaken. But for the ability to control yellow fever the ships of

the world would not dare use the canal after its completion. So may it be shown that the existence of the Panama Canal is a direct outgrowth of this work of sanitation.

At Panama it has been possible to show the possibilities of sanitation more strikingly than they could ever have been set forth under any conditions that have ever existed. The eyes of the world have been on Panama. Had the same sanitary principles been demonstrated in Philadelphia or Omaha they might almost have escaped notice. But the miracle had been worked in the very spotlight of the world, and no tropical community may remain a pest hole of contamination without knowingly calling down upon itself the condemnation of all men. Likewise can no tropical American port profit from the opportunities of commerce afforded by the Canal unless it makes itself sanitary, for ships from unheathful ports will be quarantined against.

Colonel Gorgas was sent to Panama for the great task. This was in 1904. The building of the Canal was then going through the painful ordeal of being directed by a commission of divided authority which was showing itself most ineffective in many ways, one of these being insufficient support to the sanitary officer. So it happened that yellow fever ran riot there during 1905 to such an extent that panic was abroad. There were but forty-seven deaths but these were sufficient to call into question

the mosquito theory of yellow fever and the practicability of ever accomplishing the great task.

Then came the military control of the Zone and added authority and support of the chief sanitary officer. Colonel Gorgas was given full sway and through the period that followed spent an average of $400,000 a year for sanitation. Panama and Colon were given the same treatment that had been accorded to Havana and were converted into new demonstrations of the possibility of making tropical cities healthful. Throughout the whole zone vast quantities of mosquito-harboring brush and grass were cut, swampy lands were ditched and drained until there was the least possible amount of standing water. At the head of every little stream on the Zone was set a can of oil which dripped constantly. This stream carried the oil on its surface as a thin skum throughout its course. This means death to the larvæ of the mosquito, for it keeps it from coming to the surface for air. Wherever these streams could not be induced to distribute their own oil, and there was need for it, men went with sprinkling-cans. Altogether 150,000 gallons of mosquito oil were used in the course of a year. In the end control was gained and kept through such a period of years as to make the proof absolute.

But in the meantime other equally important work along different lines was being done elsewhere. The Spanish-American War brought also under the flag the Philippine Islands. When the sanitary

officers went over with the troops in 1898 they found Manila to be a city of 300,000 people but with no more sanitation than European cities boasted in the sixteenth century. Under Spanish control a down-trodden race had been kept in ignorance and given no encouragement to lift itself from the slough of despondency and the filth of its own poor life. For centuries these people had dwelt in the midst of the disease-breeding refuse of their own creation. Among them ran uncontrolled such diseases as bubonic plague, smallpox, leprosy, Asiatic cholera.

One of the first great fights in Manila was the eradication of bubonic plague, and the manner of its accomplishment proved an object lesson to this part of the world. The American men of medicine knew that the disease was carried only by fleas that lived on rats, and Manila was the seat of a campaign against these rodents that accomplished much more than their killing, for it meant the cleaning up of the entire city. The coming of Asiatic cholera meant a stubborner fight, for the natives remembered its previous visit when as many as 30,000 people had died in Manila in a single day. The terror of the natives was as hard to overcome as the disease. Then there were thousands of lepers to be gathered up and made comfortable on the island of Culion where their disease would die with them. Beriberi, a native disease, ran riot throughout the island and everywhere claimed its toll. It was finally cured by a dietary system, the chief point in which was

so simple a thing as the substitution of rough for polished rice. In Manila a sanitary water supply and a method of disposal of refuse were the first necessities, and from this central point the good-water idea spread until scores of smaller centers were supplied with artesian wells that decreased the death rate by half. In the end Manila was given practically the only modern sewer system in all the Orient and thereby made a demonstration plant to half the world. For here is another tropical city that has become as healthy as are others of its kind in America or in Europe.

Yet another world-important development of the first half decade after the Spanish-American War was registered by another young doctor of the medical corps of the army, Major Bailey K. Ashford. Dr. Ashford was assigned to service in Porto Rico and turned up the fact that the long pitied "jibaros," these poor people of the country districts, cursed and despised through the centuries because of a great languor attributed to laziness, were in reality suffering from a little known disease which he explained to the world. Their systems were full of the hookworm, later found to be so prevalent among the "poor whites" of the southern states of America. They were men half of whose blood had been stolen and whose lives ran at such low ebb that to them existence was a misery and labor all but impossible.

The Spanish had not known that these, their

descendants, were so direfully afflicted. The French nor English nor Portuguese nor Dutch, nor any of the other nations with tropical colonies, knew that among these subject people the germ of languor was abroad and that it was converting whole races that might otherwise be strong and vigorous into miserable drones. Yet Ashford went among these people to relieve their distress from hurricane in August of 1899, and in November of the same year reported the discovery of the secret of all their misery, the presence of a disease causing the death of 1,000 of them each month, and 30 per cent. of all the deaths on the island.

Major Ashford went further and showed that this disease had been brought from Africa when the Spaniards had imported negro slaves after exterminating, through their cruelties, the natives of the islands. In fact Africa was alive with undiscovered hookworm. Dr. Charles Waddell Styles, of the Public Health Service, soon after found millions of native Americans to be suffering from the same anemia. It was present in Central America, in the Philippines, the Orient, the world around. It was eventually shown that the majority of the people of the world who live in warm climates and go barefoot were devitalized by the disease. The lazy indolence of the tropics, emphasized since man began to generalize, is being shown to be more largely a fact because of the presence of the hookworm than because of any effect of climate.

Major Ashford did not stop with the discovery of the hookworm in Porto Rico. With his government back of him he proceeded to its cure. He developed the exact dosage of thymol that would rid the human system of these parasites and the method of its administration that it might be least harmful to the system. The cure was proved effective in great numbers of cases and the machinery was built up for its administration to masses of people. By hundreds of thousands were they treated in Porto Rico until the plague of the island was gradually lessened and pressed toward eradication, the result being a revivified people capable of and willing to earn its living in the tilling of a fertile soil.

So is another object lesson given to the world which is being followed all too slowly in other tropical lands that are suffering as did Porto Rico.

The traveler in Cuba, Porto Rico, and Philippine, in the years that followed the acquisition of interests in those Islands on the part of the United States, was always impressed with the disfigurement of the faces of the peoples living therein by the pits of smallpox which they had suffered. The deeply marked face was the rule rather than the exception and the disease was always to be found among the people. No sooner had the medical corps of the army reached Cuba and Porto Rico than it saw the advisability of protecting an unknowing people from all this unnecessary suffering. These men go brusquely about obtaining results, for they have too

well demonstrated their right to leadership in these matters to brook interference.

In Cuba, during the occupation, the order went forth that every individual should be vaccinated. The order was so well executed that smallpox immediately disappeared from the island, and in the thirteen years that followed but seven deaths were reported from it. A similar period of years preceding showed 5,355 deaths from smallpox. In Porto Rico the disease was found present in twenty places on the island and similar action was taken. A million people were vaccinated within a few weeks and the disease has not since given any trouble. In the Philippines smallpox ran riot until the men of medicine sent forth vaccinating expeditions, the first of which applied the serum to 600,000 people to the north of Manila and others performed similar tasks.

The children of the natives of these islands have skins as smooth as velvet and the time of disfigurement will never come to them.

Of all this pioneer work in sanitation that with reference to yellow fever is generally considered of first importance. It stands out most distinctly as a clean cut job completed in a short length of time and opening up immediate possibilities. There is one other, however, that was begun before the yellow fever work but not completed until ten years later, that may dispute in world importance the work with yellow jack.

This is typhoid fever. Here is a complaint that affects all the people between the poles and that levies its tribute in all lands. Since war began it has caused the death of more men in the ranks than have conflicts with the enemy or than has any other disease. Like camp fever, and prison fever it has weakened contending armies more rapidly than were they able to cause each other distress.

Yet as recently as the Spanish-American War typhoid fever was little understood. Like those other great advances in medical science, the control of typhoid dates from that conflict. Like many of them it has gained its great impulses from the medical corps of the army.

Of all the men who died during the Spanish American War 86 per cent. owed their demise to typhoid fever. In 90 per cent. of the camps of soldiers during that conflict, typhoid fever appeared within eight weeks after they were established. One man in every five of those participating in the war suffered from typhoid. Six times as many men died of it as from Spanish bullets.

Here was shown to be another great need of effective work for the eradication of the common enemy. It was a task that had baffled the armies of the world through all time and to which Americans had surrendered in past wars. But America had come into her own and stood ready to attack formerly impossible tasks.

Three surgeons, Drs. Walter Reed, Victor C.

Vaughan, and Edward O. Shakespeare, were sent into Florida as a commission to get to the heart of the cause of the spread of this disease and to point the way to prevention. Previously there had been the fairly well proved theory that the disease was distributed through contaminated water or milk. This theory still stands but these army doctors added one other fact to it which has been shown to be of vastly greater importance. The housefly is vastly more important as a distributer of the disease than is any other agency. Wherever it encounters the refuse from the sick room it is prone to gather the germs thereof upon its feet and fly away. Then, wherever it alights, it plants the germs and a new infection may be started. This discovery showed the importance of disposal of refuse and of campaigns for the eradication of the housefly, measures that went far toward keeping down the disease.

Ten years passed before the second step in the typhoid war was taken. It was in 1908 that the War Department ordered Major Frederick F. Russell, of the medical corps, to go abroad and study the experiments that were being made in England and Germany in the matter of vaccination against typhoid. In Europe Dr. Russell found that these governments had, for a decade, been working upon the problem of making their soldiers immune from typhoid. German regiments in North Africa and British regiments in South Africa and India,

had been vaccinated. The means of immunization had been the injection of typhoid germs that had previously been killed. There were indications of benefits so secured and there were negative results. The theory had failed of being established but there had been flashes of great results.

Major Russell observed the methods of preparing the vaccine on the part of the various experimenters, drew conclusions as to what was the best in each idea and where each failed. He returned to America and produced a vaccine which he believed would prove effective. He used it on his laboratory staff, upon his associates in the service, upon members of their families and upon whatever other persons would offer themselves. None of these ever got typhoid afterward.

Such successful experiments had gone on for three years when, in 1911, 20,000 troops were sent into camp on the Mexican border. Here were the conditions under which typhoid usually appeared. Here, also, was an opportunity for an experiment on a large scale. It was proposed that vaccination be made compulsory with these troops, a condition that had never been applied in Europe where vaccination was only with the consent of the individual soldier. The wholesale vaccination was ordered.

At Galveston 4,500 men were vaccinated and not one case of typhoid appeared among them despite its prevalence in the city near by. At San Diego, where 3,000 were vaccinated, two cases were re-

ported. At San Antonio, where 13,000 troops were in camp for four months, there were but two cases of typhoid and both these recovered, thus showing contrasts strongly with the camp at Jacksonville in 1898 where, among 10,000 men, there were 2,500 cases of typhoid and 248 deaths.

So was the efficacy of typhoid vaccination established. It was proved over and over again in the years that followed, for the government vaccinated every soldier after 1911. Of the 70,000 to 80,000 men in the ranks the reports showed that there were but one or two or three cases of typhoid for a year and this degree of failure in effectiveness of the preventative could easily be set down to error in administration of the vaccine.

All these remarkable accomplishments came about chiefly through the efforts of the medical corps to keep the men under its charge healthy. The result that may be secured in the present or the future by humanity as a whole is merely incidental. If all the world should vaccinate itself against typhoid and rule this dread disease off the sphere, there would be a vast good come out of a work done for the military. The men who engage in these tasks always appreciate ultimate possibilities, and the well-being of humanity through all the future is a spur sufficient to lead them to any sacrifice. Kissinger, the young soldier from Ohio who bared his arm to the bite of the yellow fever mosquito and refused pay for it, had the spirit—the willingness

to go down into the valley of death—that is a part of this work. For it is given to few men to be the instrument for saving the lives of a million of their fellows, but a score of such men have lived in this generation and have stood willing to make the supreme sacrifice to that end.

CHAPTER XVIII

CAPTURING BLACKHANDERS

THE spirit of Guiseppe Morrello, one time chief of the Black Hand, is broken. Lupo (the Wolf), the proud and haughty one, the carrier of the mandates of the dread society, has been seen to throw himself upon his face in despair and weep. The gang that gathered about them is dispersed, broken in fragments, and without a head. For not only have their chiefs been sent to federal prisons, but along with them eight most active lieutenants.

So was broken up an organization that terrorized half of the United States, a gang at the door of which are laid such crimes as the notorious "barrel murder" in New York and the assassination of Lieutenant Petrosino in Italy. So are removed the men who have dominated thousands of Italian-Americans through fear, and are believed to have collected tribute in a thousand cases. So are demonstrated the methods and the results of the members of Uncle Sam's Secret Service in its constant battle against the most wily criminals of the age, from whom it seeks to protect the peaceful citizen.

The crime of counterfeiting was at last proved against these men. For a decade they escaped punishment largely through intimidating witnesses. But now they are in prison, for long terms in every case. So ended a romance of lawlessness which has but few parallels in the history of the nation.

"The Black Hand," John E. Wilkie, then chief of the Secret Service, told me at the time, "was dealt the severest blow in all its American history when the Federal Court in New York City, in 1910, sentenced to prison eight Italians charged with counterfeiting. In so doing it broke up a gang of counterfeiters that had been giving trouble for ten years. But it did more. It cut the very heart out of the best organized gang that has ever used Black Hand methods on this side of the ocean.

"Guiseppe Morrello, leader of these counterfeiters, was, contrary to general belief, the chief of a gang that was, I believe, responsible for 60 per cent. of the Black Hand extortion that had gone on in the United States in the ten years previous.

"Lupo, who received sentence for counterfeiting at the same time, and was generally considered the chief of the Black Handers, was in reality but a tool of Morrello and his outside man. Cina, Calicchio, Sylvestre, Giglio, Palermo, and Cecala were the intimate associates of these and the men nearest them in all their activities.

"The year before, fourteen others had been sent up for passing counterfeit money. They were

lesser stars in the same notorious constellation. With twenty-two of the leading members of this gang behind the bars, the country experienced a lull in the so-called Black Hand operations."

The sentencing of the Morrello gang was the last act in a blood-spilling melodrama that had been running for ten years. In it Morrello and Lupo played parts that would be hard to exaggerate. In it "Old Sleuth" in the guise of the Secret Service men was ever on the trail of the criminals.

In it there was murder, blackmail, kidnapping, extortion, counterfeiting, and fraud in a thousand phases. The bold outlaw laughed his stage "Ha, Ha!" defiantly in the face of the authorities. The red bandanna of the bandit chief appeared, and death followed.

The death sign was passed to witnesses on the stand, and they became mute.

As the curtain went down on the last scene, the leader's proud spirit was broken with the contemplation of the cold, dark cell as a future domicile, and he broke down and wept in an abandonment of grief.

Guiseppe Morrello first came under the surveillance of the Secret Service when in 1900 there appeared on the east side of New York a flood of counterfeit money. This had been passed upon small shopkeepers at many places. As nightfall approached and the lamps in these abodes of economy were not yet lighted, a mild-mannered Italian

would make a small purchase for which he would pay in a supposed Treasury five-dollar note, getting the change. Under a stronger light the money was found to be counterfeit.

This was the first entrance of the Italian-American into the field of counterfeiting. The Secret Service knew little of their haunts. A force of picked men was put on the case, and before long the scent led to the resort of Morrello in Elizabeth Street. Various trails converged there. The resort was raided, Morrello arrested and charged with the crime. There was proof, but not sufficient for conviction. Morrello was released, kept under surveillance.

It was in 1902 that the Morristown fives appeared, so called from the fact that they were counterfeits of the issue of a bank in that town. The Secret Service men discovered, because of certain peculiarities that appeared, that these notes were of Italian origin. The touch of the originator of any article will be left on it somewhere. It was the sons of Italy who were passing the money.

In tracing them the trails of the previous case were crossed. They pointed toward Morrello. They also led past the Customs House, and it was through the officials of that service that the manner of the introduction of the bills was discovered.

Olive oil, under the tariff laws, may come in by barrel at a less rate than in the cans. Therefore, it is imported in bulk, and the Italian cans are

brought in empty for its retailing after landing. Their suspicion being aroused by these empty cans, the Secret Service men went at them with their can openers. They found bales of counterfeit money in them. Morrello and some of his associates were arrested, but the evidence was not strong enough for conviction.

It is here that the plot begins to thicken, for we approach the famous "barrel murder," one of the strangest cases that the Police Department of New York has ever had to deal with, and one of those on which it had to pronounce itself beaten, although morally certain it knew who the criminals were.

A certain Italian who had been an associate of Morrello and a suspect in the counterfeit money cases was sent to prison on some other charge. He left a family that was in great need. Morrello owed him money. He sent his wife's brother, young Modino, to see Morrello.

Modino was instructed to say to Morrello that if the debt was not paid the man in prison would tell all he knew. Here the character of Morrello begins to develop. He flung back a defiance, and in such a way that it will long be remembered in the Italian quarter.

Modino was seen to leave the establishment of Morrello late in the afternoon. With him was one Petto, commonly known as "The Bull." Lupo also came into the case, having been seen at the Morrello establishment at about the same time.

That night Morrello appeared on the streets of the Italian quarter with his head swathed in a red bandanna in the best accredited bandit style. Modino was never again seen alive. The next morning his body was found in a barrel with a score of knife thrusts in his breast.

In this case the Secret Service was of great assistance to the police. They knew every man belonging to the Morrello gang and were familiar with the movements of all of them. Although their object in gathering this information was to prevent counterfeiting, they waived any advantage that secrecy might give them and placed their information in the hands of the police. Morrello, Petto the Bull, and Lupo were all arrested, but it was not possible to get sufficient evidence to convict them.

The oftener Morrello was arrested the more insolent be became. By this time he had come to sneer at the police, and dictate whatever orders he saw fit to the Italians he had come to dominate. A rough and hard-faced scoundrel, he sat in his office and sent out his orders.

A maimed hand interfered with him as an outside man, so he did the thinking and ordered others to execute his plans. He had discovered by this time the advantages that attached to the dread name of the Black Hand for extortion purposes. It is believed by the Secret Service men who watched him for ten years that he was responsible for the

greater part of such extortion as far west as Chicago and as far south as New Orleans.

Lupo was the active outside man, who carried his mandates. Because of his being more seen than his chief, Lupo came to be popularly regarded as the head of the Black Hand, but in reality he was only its outward evidence. The mind that directed it, the Secret Service men believe, was that of the maimed Morrello.

Petto, "The Bull," who was suspected of being the direct agent in the "barrel murder," was a compatriot of Lupo, and probably ranked as high in the estimate of his master. He was a man who could be depended upon to execute a desperate mission. But he was overbold in one of these, and so came to his death.

He demanded, in the name of the Black Hand, a large sum of money from an Italian merchant in Scranton, Pennsylvania, supposedly at the direction of Morrello. He appointed a time and place for the delivery of the money. The merchant kept the engagement, but instead of giving Petto the money, gave him a load of buckshot from a sawed-off shotgun. Petto expired on the spot.

It was at about this stage of his career that Morrello appeared in another of the most spectacular incidents of his life. Word was brought to him that a certain associate who was believed to have handled counterfeit money in connection with him, operating in New Orleans, had been talking freely.

It is said that he had gone so far as to threaten to expose the Morrello operations.

The chief immediately went to New Orleans in person. He was seen among the Italians of that city for three or four days. Finally, one afternoon, in true bandit style, he appeared again on the streets with a red bandanna handkerchief about his head. That night the offending Italian was found dead in his store with a score of knife thrusts in his breast very much like those received by the victim of the "barrel murder." The direct evidence was again lacking upon which to convict the dreaded visitor. Yet the Italians of all the country took this stabbing as they had the "barrel murder," as a warning not to defy the authority of the big chief.

The next crime of which the Morrello gang was suspected was the murder in Italy of Lieutenant Petrosino, the man of all the sleuths of the New York police force they most feared.

There has never been any admissible evidence to show that Morrello had any connection with this crime. It was shown at the time, however, that the business of Petrosino in Italy was to investigate the past of the members of this gang. Such evidence was being unearthed as that which showed that Lupo had fled Italy because of a murder he had committed. It was also known that members of the Morrello gang were in the vicinity of Palermo when the murder was committed.

Then begins the final chapter of the operations of

the gang, the chapter in which, because of the courage of a despised supposed weakling, known among his fellows as "The Lamb," the men who had spread terror throughout the nation were brought finally to felons' cells.

In 1909 counterfeit money began to appear in New York, Philadelphia, Buffalo, Cincinnati, Baltimore, and other cities. It was all of the same kind and all handled by Italians. On the face of it, there was evidently a well-organized gang that was spreading this false money broadcast.

So efficient had become the Secret Service drag built up by that most efficient operative in charge, W. J. Flynn, that it succeeded in gathering in and convicting fourteen of the men who were passing the money. But the men at the head of the plot were still hard to reach. This difficulty lay largely in the fact that all of their countrymen who associated with them were so intimidated that they would go to prison in silence rather than disclose the source of the bad money, for to do so meant death.

But finally the man was found who had the direct evidence and was willing to give it. This individual was Antonio Comito, "The Lamb." Comito had long been the unwilling tool of the gang. He had been so timid and inoffensive that the villainous crew regarded him as putty in their hands. Had they not tamed the proud spirits of many of their courageous and naturally upright countrymen?

Why should they fear this spiritless weakling? Yet Comito was the instrument which sent the dictator and practically all his intimates to the penitentiary.

Comito told his own story on the witness stand in the Federal Court. The eight outlaws, most dreaded among their countrymen of all those that the Italian quarter had ever known, sat in the prisoner's box, and "The Lamb" turned his head away while he testified, for he had not the courage to face them. He said he knew that he was to be killed for what he was doing, but that it were better to die than live so miserably.

While the trial progressed the Federal Building became filled almost to bursting with low-browed, ill-kept, dangerous looking Italians. The authorities became alarmed, and Secret Service men and Deputy Marshals were brought into the building. About the corridors these alert men of the law walked continually and dispersed dark-faced rascals who got together in whispered conversation. The witness was constantly surrounded by guards, and when he was taken to and from the courtroom, it was between ranks of deputy marshals. One morning Marshal Henkel found a long dagger sticking in his door, obviously as a warning of the fate that might await the enemies of the accused.

But despite all this, Comito, "The Lamb," went forward with his testimony, harassed by lawyers that the accused were able to retain. Three times

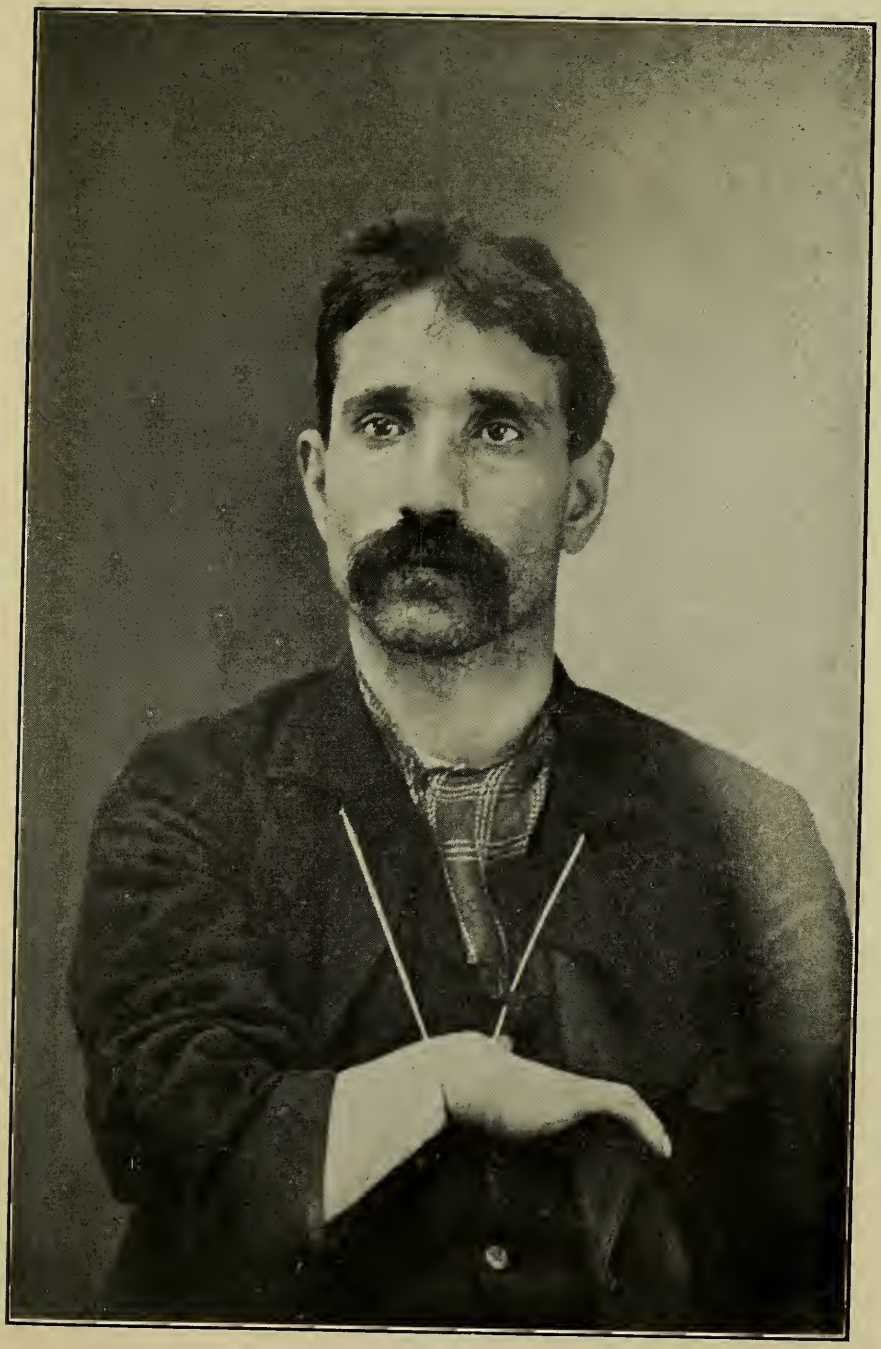
did the Secret Service men see some Italian in the room give the death sign, the thing most dreaded by the sons of Italy, and usually sufficient to close their mouths against any further utterance.

This sign is given by raising the closed hand to the mouth biting the knuckle of the first finger, and turning the action off by running the finger around the edge of the collar. Comito would falter and almost faint at such times, but his story went forward to the end and was substantiated by such additional evidence as to establish its unquestioned truth.

Comito said that in October, 1908, he met Cecala, one of the accused. Comito was well educated and a printer. Cecala offered him a job, saying that it was in Philadelphia. They went to the river front at night and took a boat. They disembarked at a point which Comito later learned was Highlands, N. J. They went to a farm rented by Cina, and there he was held prisoner for months.

There he operated a printing press and produced great quantities of spurious money. From there he returned to New York with members of the gang on shopping tours. Their purchases were verified by many merchants.

Then came Morrello, Lupo, and other members of the gang. Their visits were likewise verified. There the counterfeit money was dealt out and the profits divided. Three thousand five-dollar certificates Comito produced, and many twos and ones.



GUISEPPE MORELLO, CHIEF OF THE BLACK HAND

DUTCH BOYS

In all he printed $46,000 in money while held a prisoner.

When the evidence was all in the verdict was inevitable. When the men received their sentences, the least fifteen years, and the greatest, that of Lupo, thirty years, there was an ominous hush in the courtroom. The men who watched within and who waited in the halls seemed to expect some mighty demonstration on the part of their dreaded chiefs. For had not these men defied the power of America for all these years and had they not removed those who opposed them?

The confidence of the intimidated horde was greatly shaken when Morrello, the chief, and Lupo, "The Wolf," threw themselves on the floor and howled in terror. They were at last overcome. Their spirits were broken. A vigilant and benevolent government had again served the people who go to make it by removing from among them these individuals who interfered with their privilege of the pursuit of happiness granted them by its constitution.

CHAPTER XIX

PREPARING FOR POSSIBLE WARS

WERE there a war with Germany and were the troops of the nation to penetrate within ten miles of Berlin, they would be in possession of information so exact that their guns could be so trained as to demolish the emperor's palace or any other building in the city, despite the fact that those structures were entirely beyond the range of their vision. The gunners could work in the dark, shoot over high hills. They would nevertheless hit the mark.

Their guns would be sighted in accordance with war college maps, made years previously. They would be surer of hitting the mark than if the gunners were looking at it. They would know every hillock, brook and plain in all the region roundabout, and they would have at their command the mathematics of applied gunnery, one of the most remarkable of sciences.

Were the exigencies of war to require that an army be landed at Port Arthur, conveyed across Siberia and attack St. Petersburg, the war college would know the detail of every stage of the advance, how troops could be conveyed, where camps should be

made, where provisions could be got. The road from the Rio Grande to Mexico City would be as plain to them as the streets from your home to your place of business. Were war to break out between this country and any nation on earth that is worthy of the steel of the United States, the information would be in hand to show how we might best attack that country or resist an attack by it.

For the United States maintains an institution the business of which is to know how to pass from a state of peace to a state of war. The most secret, the least known of its institutions is that vital link in the great military chain, the War College. And the business of the War College is to see to it that the people of this nation are not placed at a disadvantage should the supreme emergency arise.

The War College is a school where grizzled veterans, surfeited with experience, come to get that refinement of training that would enable them to efficiently handle an army in actual combat. It is, further, the repository of the secret military information of the nation. It is intrusted with the gathering of this information and the guarding of it. There are secrets hidden in its archives that you or I could sell for millions to other nations, if we knew them and if we had in us the hearts of traitors. It is the goal of the ambition of every man who goes to war. It is the last word in military affairs in the western hemisphere.

The War College came into existence when Elihu

Root was Secretary of War. It is his child. He made possible the thing that the big men of the army had been demanding for fifty years. The War College building is a monument to Mr. Root. Its corner stone was laid by him in 1903 and the building was completed some two years later. The first demonstration of the advantage of this intellectual center for war operations was had when the army was mobilized at Fort Sam Houston in 1911, in such short time as to cause the nation to gasp. The clockwork shuttling of troops to Vera Cruz in 1914 with never a hitch was a further evidence of efficiency on a large scale. There is developing a realization of the fact that the nation is on a different war basis than that of 1898 and the wise ones say that the War College is largely responsible for the difference. So what of the War College?

In the first place it is a school. The students are mostly men between forty and fifty years of age. There are but twenty-three men in each year's class. These are colonels, lieutenant colonels, majors, captains. They are the selected fittest men in all the army. The process of elimination has been operating for twenty years in their selection. It began in the first of the four years at West Point.

This elimination continued through the three years of garrison school at the various posts at which the young officers were stationed. It was in operation when the officers passed through the year of

the school of the line. Finally it was working regularly when the well-advanced officers got to the army's staff college. Everywhere the unfit for high military preferment were eliminated. Everywhere there was the search for the military genius. Finally the twenty-three fittest were selected and the stiffest test of efficiency and genius for war of them all was applied. The officers were put through the War College.

The men who make good at the War College have the final chance at that small and exclusive aggregation of final war authorities, the general staff. There are some fifty men on the general staff. They are the general advisors of the chief of staff, the Secretary of War, and the President. When a war emergency arises the President asks the Secretary of War for advice. The Secretary asks the chief of staff and the chief of staff appeals to this general staff. They are the military experts of the nation. They are the men who do the actual work. Their recommendations, after the approval of the officials higher up has been attached, guide all army operations, fight all wars.

When the officer comes to the War College he knows all the detail of army life and is ripe with the experience of the field. He has, however, never commanded an army. He is to be fitted to take charge of the biggest army that the nation may be called upon to muster in time of war and fight battles with it. It is to be determined whether or

not he is of the stuff that would rise to such an emergency. He is to be intrusted with the secret information in the nation's greatest storehouse of secrets.

His instructors are the country's greatest war authorities. These officers are selected because of special ability to lecture on special subjects and to sit in judgment upon the work of the student officers.

A typical class lesson may be something like the following:

The officer is placed theoretically in command of an army on the march. A map is shown which gives the position of his supposed command. It is a war map; that is to say, a topographical map giving all the details as to the nature of the country. His army is in extended formation. He receives a message by courier to the effect that he is about to be attacked on the flank. He is asked to call his officers together and give them the proper commands to meet that attack.

At first the officer is given two days to formulate his orders. Another situation is evolved and he is given a day in which to issue them. Many situations are put up to him and the time is always reduced. In the end all manner of conditions such as might present themselves to the commander of an army in the field are brought forward, and he is given ten minutes in which to meet them and issue his commands. He is to do the thing exactly

as it would have to be done were he fighting an actual war. He is given only the time he would be given under those circumstances. He has to make good or he is not deemed a fit man for an important command. His orders, scanned by the instructors, have to show that his head was clear, his information was correct and his judgment was good, or he cannot get past. It is the elimination test still at work.

The manner in which the army gathers confidential information is one of the most closely guarded secrets of the nation. It is not even generally known that military attachés at embassies and legations are the official spies of the nations which they represent. The governments tolerate this interchange of spies. The public believes them social ornaments attached to the various embassies or legations.

The military attachés of France, for instance, wanting any bit of information about a gun of this government, would apply to the War College for that information. As a courtesy to a friendly nation, we might interchange guns with France. This much of the work of the attaché is above board. He goes about the photograph laboratories of the city in which he is situated. He buys largely of the views, particularly those around any military stronghold. He even gets pictures of guns, forts, and navy yards. He secures detail maps of the entire country. Our geological survey

has probably never made a map that is not now in the possession of Germany.

But the military attaché is known to go even farther than this. He is often the head of an extensive spy system that reaches throughout the country in which he is stationed. There are certain secrets which his nation wants. Good men and true are sent to get those secrets and no questions are asked as to method. Where information is to be had there it is gotten. The spy system of the United States is admittedly much less extensive than that of any of the great European countries, but it may be taken as an assured fact that when the Yankee army wants a bit of information it has its methods of getting it.

An excellent example of the province of the military attaché was shown in the Russo-Japanese war. When the Russian army went into the east a French attaché went with it. This attaché, representing a friendly nation, was given infinite detail as to the Russian army. Probably he was given more than he should have had. He transmitted this information to his own government by cipher. The French government possibly erred in allowing too much of this information to get into the hands of the newspaper men. The Japanese attaché at Paris immediately cabled it to his home government around the world. Thence it went to the Japanese army as it faced the Russians. It helped that army to whip its foes. Military attachés sent the

information around the world that could not get across the ten-mile gap that separated the armies.

Surrounded with mystery, filled with officials who have nothing to say when interviewed, steadily acquiring from all possible sources the fullest and most accurate information up to the very minute of all that the other nations in the world are doing in the way of defense and offense, knowing to a man the strength and disposal of foreign armies, where they are and what they are doing, and learning all this and very much more by agencies of which the nation that goes calmly to bed at nights never dreams, the War College becomes a vital agency of the government.

Let a military problem come up; let it be necessary to move, feed, clothe, supply guns and ammunition to an army or set it to fighting, and then this silent, mysterious, powerful agency will have plenty to say and will say it in tones that the dullest may easily understand.

A collection of war maps of the United States and of foreign countries occupies a harmless enough looking place on the list of apparatus of this institution, and the mind accepts it as quite necessary and natural. But what was the alleged offense for which Dreyfus suffered so long on Devil's Island, for which his friend Zola went through such a period of odium for standing by him and over which the entire French nation was almost in the agonies of war? It was only the question of a little map or

plan of an insignificant place in France that Germany had got hold of in some mysterious way.

General information of foreign armies and fortresses finds a place in the work of this course; but the data at hand are not quite of the same general character that may be found in last year's almanac or in an encyclopedia, nor are they derived from exactly the same source. Indisputable facts up to the very minute is the sort of information that supplies the data for the thousand and one problems of military science upon which the students of the War College at Washington work.

"Information is the first step toward success in war," is the great maxim laid down and the one that is always uppermost in preparations for war or defense. "Find out all that can be found out about an enemy's country and movements and keep him from finding out about your own," is another way in which one of the foremost strategists of the United States expresses it. And this information, variously acquired, forms the great basis of what are called the "confidential archives" of the War College.

It was reported at the beginning of the mobilization of troops in Texas in 1911, and again in 1914, that the War Department had sent down 4,000 maps with the army. Some said they were maps of Mexico. There were men with the army down there who had been graduated from the War College who knew more about the geography of Mexico than some who have lived all their lives in one place can

tell of their own neighborhood. The men of the War College doubtless know more of Mexico than does any Mexican, for Mexico has no such highly developed institution. In a camp of instruction, such as that at Texas City purported to be, maps are the chief working tools of the strategists and form the text-books for practical maneuvers and tactics. So, of course, these would be taken.

Maps, plans, drawings, photographs and written descriptions of foreign countries and their armies keep pouring into the War Department from all over the world. Had "Old Rough and Ready" had a knowledge of the geography of Mexico away back in 1845, or had the country had a war college at his back, he would not have spent a whole year down there before he got busy, nor would he have attacked Monterey with 6,000 men, glorious as this action was.

General McClellan said during the Civil War that "such maps and plans as we have of the country are absolutely worthless, because they are unreliable. We are more often deceived by the data of our maps than we are by the enemy. Many of our best-laid plans go wrong because our maps are bad." In the Franco-Prussian war of 1871–72, the French minister of war had no maps of France prepared because he so confidently said that the war would not be fought in France, but in Germany.

The Germans were well supplied with accurate maps of France.

The British encountered many difficulties in the Boer war because they had no good maps of the country and therefore did not know the nature of the region in which they found themselves nor what to expect.

Maps that come in from foreign sources through the War Department leave not a trace behind them in their official passage to the War College. There are no filing records in the War Department that tell where they came from or who sent in any information. The means of supply is a secret service and its work is confidential.

In such public documents relating to the War College as are accessible, the pages are plentifully besprinkled with rows of asterisks, which show that there is much contained in the originals that it is neither safe, politic, nor desirable that the world at large should know. The very purpose of the institution would be defeated if it were known. But day by day the accessions go on, to be used in study and to be safely stored for such emergencies as no man is wise enough to predict. Meantime, there is graduated every year a corps of field officers that in point of efficiency in all that goes to make a modern soldier has never been equaled in the history of the country.

As to the ethics of gathering this information, the justification of the means employed is given in the same terms by every nation in the world—remember it is for war. The old days of knighthood, when

armies withdrew to a level plain and fought it out on equal terms, have passed forever. The principle of modern warfare is to catch the other nation at as great disadvantage as you can, and have your own army as well prepared as possible. It is the business of the department of military information of every nation in the world to learn as much as may be about the military affairs of other nations. They all do it, and do it in the same way as the War College is doing it.

CHAPTER XX

ASSIMILATING THE IMMIGRANT HORDE

IN Europe there are hundreds of millions of people who dream the same fair fancy whenever the burdens of their hard lives for a moment allow the springing in their breasts of eternal hope, and the dream is always of America. In Asia, where the nations are old and the peoples are of such a density as cannot readily be appreciated in a land of magnificent distances, the multitudes are awakening to the possibilities of life in the West. Unnumbered men and women who have never known the feel of a well-filled stomach, the touch of comfortable clothing, the thrill of political freedom, nurse as their heart's first desire the possibility of sometime landing in America and matching the capacity for work that is within them against the fabulous wages that are to be had, that wealth may come to them and theirs.

Each year there are coming to the United States a million such people. Of these 750,000 are from East and South Europe—Italy, Russia, Finland, Austria, Greece, Turkey, Spain. But 150,000 now come each year from western Europe, from Germany, Great Britain, the Netherlands, Scandinavia

—the countries that formerly furnished the raw material for the making of the nation of the West. Almost to a man these newcomers are people of toil whose passage money has resulted from a struggle so titanic as to be almost unbelievable. They are workers, intensely earnest, tragically anxious for opportunity.

The United States has extended an easy welcome to these immigrants from Europe. Only to the awakening hordes of Asia has the United States, in alarm, put up the bars. Altogether, in the ninety-five years of immigration up to 1915, 32,000,000 people have been admitted at the nation's ports. Of these the floods have come since the dawning of the present century. Those floods have developed vast problems because they have poured, not from the parent stock of western Europe, but from the Mediterranean.

The American has been especially fortunate in the conditions under which the race of people of which he is a member came into being. When the nation was young it was the men of enterprise, courage, resourcefulness, who crossed the seas to make themselves new homes. This was not a task for drones nor weaklings. Thus was a natural process of selection set up and it came to pass that the parent stock of the young race was made up of the hardy spirits of the nations of western Europe. These were the pioneer races and the venturesome spirits were selected from them. It was to be expected

that a very superior people would spring from such an ancestry.

But when the United States grew great and strong and prosperous, her attractions appealed to a different class of immigration. There was no longer the demand for the spirit of the pioneer. Those who were oppressed by poverty and lack of opportunity, who looked abroad for a chance of prosperity, became the immigrant class. And the nation was new, there was an abundance of room, there was work untold to be accomplished. So the bars remained down to almost whoever wanted to come. The hordes of the oppressed, the stinted, the starved, have been pouring in. Great ships disgorge 5,000 and 10,000 of them a day at Ellis Island. They are a tortured mass that seethe like cattle through the chutes to be examined by the inspectors.

There are a few comparatively easy conditions that they must meet. There must be no contagious disease, there must be a comparative degree of physical fitness, there must be no glaring mental or moral defect that may be recognized. If any of these is found the applicant is returned to Europe. The steamship companies are required to take back such passengers free of charge. It is but a slight penalty and therefore does not cause the ship owners to exert much care as to the fitness of the passengers they receive. Of the million a year who apply, some 20,000 are returned to the point of embarkation. Each of these returns is a personal tragedy,

for a whole family has slaved and starved for years to give this individual his opportunity. But where one is turned back fifty are admitted. This country could save the 20,000 tragedies a year by having the inspection at the point of embarkation but there are small, obvious matters of this sort that a great nation fails to do. Likewise, if the inspection were made before the immigrant has spent his money, the service would have the heart to make the requirements and their enforcement more rigid.

The government of the United States does not regard the larger phases of the immigration question in its administration of the service. Governmentally the problem is merely whether an applicant will be self-supporting and not become a charge upon the community. The regulations are drafted with this idea as a basis. That great question of the effect of immigration upon the nature of the race of the future is given little consideration.

The western European was the foundation stock in America. With the peoples of the Mediterranean adding half a million prolific individuals to the population each year, there is bound to come a change in the whole people. If present conditions continue one-half of the blood of the typical American of the coming century will be Slavic. That individual will be a different man from the American of to-day. Whether he will be an inferior individual is a question to which the United States is paying no attention.

This admission of the poor of European nations is one of the most magnificent charities the world has ever known when considered from the standpoint of the people admitted. It makes it possible that the conditions of all these people and many depending upon them should be inestimably bettered. It brings vast happiness into the world that would not otherwise have existed.

The task of receiving and assimilating these masses is one of the greatest of Uncle Sam's modern miracles. But there is the question of the advisability, from the standpoint of this nation, of being so liberal in this respect. The peculiar conditions under which the United States finds itself of being the land of promise to all the world, offers such an opportunity of race building as has never before presented itself. The average immigrant from the Mediterranean who reaches American shores to-day is the best of his kind. Only the Italian peasant of vision, industry, determination, could have overcome the difficulties that lay between him and America. The choicest spirits in all the communities find a way to get to America. These are to become the parents of the generations of the future. But the federal government has the power to make the requirements for that parentage still more exacting. If only the men and women particularly fitted when viewed from the standpoint of the race of the future were admitted, that process of selection which is said by scientists to be the surest method of

developing excellence in coming generations might be rigidly applied to the men of all lands who are allowed to become Americans. So might be developed a race of such quality as the world has never known before. This fitness might well be made the standard by which the immigrant is measured.

As a method of preventing the coming of too many immigrants, the educational qualification as a bar to admission has, of late, been strongly advocated. It is currently favored by politicians, labor leaders, members of Congress. It would reduce the number of people who are let in by 30 per cent. Yet the educational qualification would be no correct measure as to the fitness of an immigrant to add his blood to that of the American of the future. Some dwarfish little Slav with his heart full of anarchy might be able to read while the hulking giant from the hills of Norway might not. So would the educational qualification fail to accomplish the most important of desirable ends.

But practically all of these immigrants use the opportunities of the New World to the utmost and make of themselves most successful and productive citizens. It is but necessary to trace a few of them to determine the result of their coming, the good to them and to the United States.

Just outside of Boston there is a group of a dozen Hungarian farmers. Not long ago the house of one of these burned down. Money lenders wanted 8 per cent. interest on a loan sufficient to rebuild the

house. One of the Hungarian farmers who had been upon this land but six years immediately appeared and loaned his fellow-countryman $1,500 at 4 per cent. interest.

Throughout New England the abandoned farms of yesterday are becoming the gardens of to-day through the labors of these foreigners. Strangely, 90 per cent. of these farmers are Polanders. Some years back it happened that many individual Polanders began small farming in New England. They demonstrated to their fellow-countrymen the profits that were to be made from these farms. If the present tendency continues it is estimated that in twenty years more the Poles will own the great majority of the farm lands of New England.

At Vineland, New Jersey, there is a settlement of Sicilians which numbers 6,000. The real estate holdings of these Sicilians are worth $4,000,000. One family in a single year established a record by producing $9,000 worth of sweet potatoes. Prosperity reigns throughout the community, and with prosperity among the immigrants there is always happiness.

Tontitown, Arkansas, was founded a decade and a half ago and its small farms of twenty and forty acres were sold to Venetians at $15 an acre. Those farms are now yielding crops that are worth $100 an acre each year to their owners. Grapes and other fruits are making these transplanted Europeans wealthy.

These are but the tales of little groups of immigrants who have found their feet planted in the soil and have gained the proverbial strength which comes from the touch of mother earth.

Twenty-two years ago a representative of the federal Bureau of Immigration visited the home of a certain Hungarian in Scranton, Pennsylvania. There he found the man and his family living in a mere hovel and amid the greatest of squalor. Recently he returned to Scranton and visited this same home site, which he found still occupied by the same man. As prosperity had come to this immigrant he had added to and improved his residence until it was now the home of a well-to-do family and thoroughly American in every respect. He asked for the two children who had been youngsters rolling on the floor and crudely dressed in gunny-sacks upon his previous visit. The daughter of the family is now teaching music in one of the public schools of Scranton. The son is a steam engineer in the mines. The father is in business and prosperous and independent. So is an example shown of the manner in which the family of a very poor laborer about a mine will advance and work itself out to eminent acceptability from the American standpoint.

The Hungarians, Austrians, and South Germans are to be found in America wherever there is coal mining. There were coal mines in the regions from which they came and they know something of that business. They are not miners, however, and must

begin as mere laborers and acquire proficiency and in the end emancipation. For these Hungarians and Austrians are by nature and instinct farmers. They have not been coming to America for a great many years, but already they are finding themselves and learning how to work their way back to the soil from which they came. As they follow mining farther west they are brought more directly in touch with farmers, and it is found in Illinois and Iowa that one after another of these miners is leaving the work underground and acquiring small tracts of farm land where he and his family immediately develop an enviable independence.

Most of the immigrants land in New York. These humble people have always been accustomed to walk from place to place, from village to village, in their native countries. The newly landed immigrant starts out on foot soon after landing. He walks to the waterfront in one direction and then in another. He finds water on all sides, and is always turned back upon himself. He is really frightened in this strange land and quite naturally hides himself among his own people in whatever section of New York settlements from his native land are to be found. But all the time he is longing for the open country and a little home of his own.

One year there were 250,000 people among those who came to the United States who could neither read nor write. Another year there were about 200,000. This means that 30 per cent. of all those

who come are illiterate. They are but children, desperately in earnest, intensely serious. No country boy thrust into the mêlée of city streets was ever so ill at ease as they. The country boy is in his native land, is less ignorant, talks the language of the people about him.

Over three-fifths of all the immigrants coming to the United States remain in the five eastern states contiguous to the port of entrance at New York. These immigrants differ widely from the earlier ones in respect to their occupations and the locality to which they go. Contrary to what was formerly the case, a large proportion are unskilled laborers and go to the manufacturing and mining centers, where the immigration commission recently found that there was an oversupply of unskilled labor. They often herd together, forming in effect foreign colonies, in which the English language is almost unknown. Miserable economic and sanitary conditions exist in many of these colonies, as witness, for instance, in New York City the frequency with which the state factory inspectors are compelled to attach the red "unclean" tag to articles made in shops and factories where aliens are employed.

But the immigrant does not go to the congested city as a matter of preference. He is taken there in the first place because it is the part of America of which he has heard most, and in the second place because his animal instinct drives him to the homes of his kind. His first great obstacle is to learn

something of the language of the people among whom he is thrown. Here among his fellows he begins this task. Temporarily he may accept whatever employment presents itself, whether it be peddling bananas, strike breaking, or common labor on some construction work. He may find a steady job for years. If so, he never sees beyond it into the opportunities of America, and when he has acquired sufficient money he will return to Europe and buy himself a one-acre farm. But all the time he is looking for that opportunity to get himself a start in the small business he knows, or upon a small piece of land, which is his first love. This government might profit much more greatly through the coming of the immigrant if it would watch him a little further and guide his course to some of its unoccupied land.

It is interesting to note that certain races in America follow certain avocations. There is the Greek, for instance, who shines all the shoes on this side of the ocean. The Greek got started in the business of shoe shining in a queer way. He was so situated as to offer himself advantageously to the purpose of certain Americans who organized a shoe-shine trust. The Greeks who come to America are mostly from the cities, being in this way different from the Italians, who originate mostly in the small towns and the country. The Italian wants to be independent, wants to get started for himself. This is because he has worked for himself in the country. But the

Greek is willing to accept almost any employment on almost any terms. He does not know how to farm, nor how to mine. Therefore, he is found doing the plainest and most unskilled labor and for the lowest wages. The Greek boys could be employed cheapest and with most likelihood of permanency by the shoe-shining trust. They were thus started in a given industry and guided the courses of their fellows who followed. Likewise are the Greeks most likely to be found doing such labor as railroad building and other unskilled construction work.

When the figures show that 125,000 Hungarians arrived in the United States, it may safely be estimated that 100,000 of these found their way into the mines of Pennsylvania, West Virginia, and the other coal-producing states. The same thing is true in almost as large a proportion among the Austrians that come to America. The Italians do all manner of ordinary work through the first years after their arrival, but they cannot be turned aside from the idea of a little business or a little farm of their own when they have saved enough. The 200,000 Russians who last year arrived have even a stronger tendency to get on American farms, for they are peasant farming people before they come.

So of the Poles who came to America last year it is interesting to note that 4,000 went into Connecticut, 6,000 into Massachusetts, 10,000 into Illinois and 16,000 into the State of New York,

and it is known that most of these immigrants found a footing on the farm.

More actors and clergymen were English than of any other race admitted; more lawyers were Cuban; more musicians were German and Italian; more bankers were Hebrews, as were blacksmiths and book-binders. The Irish led in their contribution of masons and iron-workers and contributed a large share of teachers. So may the gamut be run indefinitely.

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